Surgery, Gynecology and Obstetrics

An International Journal
Published Monthly

EDITORIAL STAFF

FOR AMERICA

John B. Murphy, M. D.
E. Wyllys Andrews, M. D. J. Clarence Webster, M. D.
L. L. McArthur, M. D. E. C. Dudley, M. D. Frederic A. Besley, M. D.
A. J. Ochsner, M. D. C. S. Bacon, M. D. William R. Cubbins, M. D.
John Ridlon, M. D. Cecil v. Bachellé, M. D. John C. Hollister, M. D.
Rudolph W. Holmes, M. D.

FOR THE BRITISH EMPIRE

A. W. Mayo Robson, D. Sc., F. R. C. S., London
B. G. A. Moynihan, M. S., F. R. C. S., Leeds John Bland-Sutton, F. R. C. S., London
Harold J. Stiles, M. B., F. R. C. S., Edinburgh John Stephen McArdle, F. R. C. S., Dublin
James Rutherford Morison, M. B., F. R. C. S., Newcastle-on-Tyne

---

Franklin H. Martin, M. D., Managing Editor
Allen B. Kanavel, M D., Associate Editor

Volume XII
January-June, 1911

PUBLISHED BY
THE SURGICAL PUBLISHING COMPANY OF CHICAGO
31 NORTH STATE STREET, CHICAGO
1911

COLLABORATORS

CHICAGO

Ex Officio { ALEXANDER HUGH FERGUSON, M. D., President Chicago Medical Society.
JACOB FRANK, M. D., President Chicago Surgical Society.
G. KOLISCHER, M. D., President Chicago Gynecological Society.

W. H. Allport, M. D.
Frank T. Andrews, M. D.
Carl Beck, M. D.
James Burry, M. D.
Henry T. Byford, M. D.
Frank Cary, M. D.
Charles Davison, M. D.
Joseph B. DeLee, M. D.
E. J. Doering, M. D.
Frank B. Earle, M. D.
Alex. H. Ferguson, M. D.
Albert Goldspohn, M. D.
David W. Graham, M. D.
A. E. Halstead, M. D.
M. L. Harris, M. D.
Wm. M. Harsha, M. D.
J. C. Hoag, M. D.
Gustav Kolischer, M. D.
Henry F. Lewis, M. D.
Andrew McDermid, M. D.
H. P. Newman, M. D.
John E. Owens, M. D.
C. E. Paddock, M. D.
S. C. Plummer, M. D.
C. B. Reed, M. D.
H. M. Richter, M. D.
E. C. Riebel, M. D.
Wm. E. Schroeder, M. D.
E. J. Senn, M. D.
D. A. K. Steele, M. D.
Weller Van Hook, M. D.
Bertha Van Hoosen, M. D.
Lucy Waite, M. D.
T. J. Watkins, M. D.

NEW YORK

J. D. Emmet, M. D. Austin Flint, Jr., M. D.

BOSTON

Maurice H. Richardson, M. D. Walter L. Burrage, M. D.
Edward Reynolds, M. D.

PHILADELPHIA

E. E. Montgomery, M. D. John B. Deaver, M. D.
Edward P. Davis, M. D.

BALTIMORE

Howard A. Kelly, M. D. J. C. Bloodgood, M. D.
J. Whitridge Williams, M. D.

SAN FRANCISCO

Beverly MacMonagle, M. D. George Goodfellow, M. D.

DENVER

W. W. Grant, M. D.

WASHINGTON

Henry D. Fry, M. D. J. Wesley Bovée, M. D.

ROCHESTER, MINN.

William J. Mayo, M. D. Charles H. Mayo, M. D.

ST. LOUIS

N B. Carson, M. D. Walter B. Dorsett, M. D.
M. G. Seelig, M. D.

KANSAS CITY

A. A. Cordier, M. D. J. D. Griffith, M. D.

LOUISVILLE

Louis S. McMurtry, M. D. Ap. Morgan Vance, M. D

COPYRIGHT BY
THE SURGICAL PUBLISHING COMPANY
OF CHICAGO
1911

CONTRIBUTORS TO VOLUME XII

ANDREWS, E. WYLLYS....63, 88
BACON, CHARLES S....168
BALCH, R. E....74
BALDWIN, J. F....492
BARKER, M. R....384
BECK, EMIL G....1
BELL, W. CLAIR....471
BEVAN, ARTHUR DEAN....324, 391
BLAIR, V. P....289
BLANCHARD, WILLIAM H....494
BORELIUS, JACQUES....519
BRAASCH, W. F....374
BRUCE, HERBERT A....102
BRYAN, R. C....134
BUCHANAN, J. J....78, 397
CONN, L. C....457
CONNELL, F. GREGORY....434
COTTON, FREDERIC J....235, 494
DAVID, V. C....365
DAVIS, CARL B....112
DAVISON, CHARLES....283, 299
DEWITT, W. A....166
EASTMAN, JOSEPH RILUS....160
EISENDRATH, DANIEL N....167, 496, 533, 602
EISENSTAEDT, J. S....353
EWING, JAMES....230
FISCHER, HERMANN....476
FRANK, ROBERT T....82, 451
GILMER, THOMAS L....489
GOODALL, JAMES R....457
GOODMAN, CHARLES....56
GORRELL, JAMES....50
GOULD, C. W....262
GREELEY, JAMES T....593
GUFFEY, DON CARLOS....85
HALPENNY, JASPER....50
HESSERT, WILLIAM....488
HIRST, BARTON COOKE....296
HOOVER, A. R....288
HORSLEY, J. SHELTON....115, 184
HUGGINS, R. R....276
HUTCHINS, HENRY T....591
JONES, EVERETT O....131, 193
KAEMPFER, LOUIS G....357
KELLY, HOWARD A....30, 180
KENNEDY, J. W....562
KOLISCHER, G....341, 391
KRISTELLER, LEO....56
KÜMMELL, HERMANN....311
LANE, W. ARBUTHNOT....221
LESPINASSE, V. D....40, 46, 477
LEVISON, CHARLES G....162
LYNCH, FRANK W....441, 500
MACCARTY, WM. CARPENTER....211
MARDEN, J. K....288
MARTIN, FRANKLIN H....34
MAYO, CHARLES H....227
MAYO, WILLIAM J....97, 524
MCDONALD, ELLICE....546
MCGRATH, BERNARD FRANCIS....211
MCLEAN, ANGUS....588
MEISENBACH, ROLAND O....411
MORRIS, ROBERT T....594
NIXON, P. IRELAND....331
OSTROM, HOMER I....542
PALMER, FRANK A....526
PETERSON, REUBEN....9, 152
PILCHER, PAUL M....109
PLUMMER, S. C....528, 597
PORTER, JOHN L....47
PRINCE, HOWARD L....530
RICHTER, H. M....568, 597
ROBERTS, JOHN B....24, 579
RUBIN, I. C....117
SCHRAGER, V. L....270, 301
SCHWINN, J....79
SCOTT, A. C....585
SCUDDER, CHARLES L....72
SEELIG, M. G....262
SHILEY, GEORGE F....590
SPEED, KELLOGG....466
STERN, WALTER G....77
SUTTON, WALTER S....166
THOMAS, B. A....345
TINKER, MARTIN B....539
TRACY, STEPHEN E....361
VINEBERG, HIRAM N....378
WATHEN, JOHN R....79
WATSON, C. M....576
WATSON, LEIGH F....388
WERELIUS, AXEL....158
WILLSON, PRENTISS....20

SUBJECT INDEX TO VOLUME XII

ABDOMINAL, structures, Removal of an unusual number in a malignant intestinal growth, trans., 184; wall, Desmoid tumors of after operation, trans., 190; incision, Closure of, 381; and pelvic outlet operations combined, A position for saving time in and facilitating, 585, trans., 183
Address, President's, Southern Surgical and Gynecological Assn., 187; Western Surgical Assn., 198
Adenoma, malignant papillary of the kidney, 353
Adenomatosis vaginæ, a hitherto undescribed condition, abs., 406
Adhesions and kinks of the terminal ileum, Intestinal obstruction due to, 227
Adrenal and renal tumors, malignant, Fever in, abs., 504
After-results of abdominal operations on the pelvic organs, abs., 92
Amenorrhœa, complete, with heredity as a probable etiological factor, 288
American Clinical Society, Surgeons of Great Britain and operations performed by them as witnessed by members of (Lantern slide exhibit by Willard Bartlett), trans., 187
Anastomosis, blood-vessel, magnesium ring, Technique of, 477
Aneurism, trans., 185
Anteflexion, Treatment of, trans., 183
Antiseptics, Osmosis as an important factor in the action of, 262
Anus, Complete anatomical and functional restoration of, 591
Appendectomies, A new method of treating the stump in, 593
Appendicitis, acute suppurative, trans., 194
Appendix, primary sarcoma of, 131, trans., 193; obliteration, carcinoma and diverticulum, Clinical and pathological significance of, 211
Artery, renal, Some experiments on, 46
Axilla, so-called mammæ of, without nipples and ducts, in the pregnant woman, abs., 407

BACK-STAY, wire, Insertion of in vertebral fracture, 295
Bag, new, for the hydrostatic dilatation of the cervix uteri in pregnant and parturient women, 296
Biliary, toxic, cases, Catheterization of the common duct as a practical and effective upper route for enteroclysis medication in (McArthur's procedure), trans., 185
Birth, parturition, pregnancy, conception, Studies of the uterine myoma in its relation to, abs., 206
Bismuth paste, Beck's, The treatment of chronic purulent inflammation with, abs., 505
Bladder, The best method of exposing the interior of in suprapubic operations, 30, trans., 180; Operative method for exstrophy of, 158; tubes and ovaries, Tuberculosis of, 341, trans., 391; wall, Suprapubic transcystic removal of calculi impacted in the portion of ureter which is situated in, 524; urinary, Inguinal hernia of, 542
Blood, Treatment by direct transfusion of for hæmorrhage of the newborn, 40; vessel anastomosis, magnesium ring, 477; and chloroform, Simple method of conservation of during operation (Passive hyperæmia of the extremities), abs., 503
Bone, wiring with a new material of great tensile strength, 79; plasty after resection of long pipe bones, abs., 304
Braces and splints, non-inflammable celluloid, 77
Bradycardia of the puerperium, 441, trans., 500
Brain diseases, The operative lowering of intracranial pressure in tumors and other, abs., 307
Breech presentation or podalic version, A modification of the usual technique in the delivery of the first arm in, 85
Broad ligament, anterior, Plication of for retrodisplacements, trans., 200
Buttonhole stitch, Finishing the, 78, 397

CÆCUM, Volvulus of, trans., 197
Cæsarean section, postmortem, Legal aspects of, trans., 168; with special reference to the time of operation and its technique, trans., 181; symposium at the last International Congress for Obstetrics and Gynecology, abs., 204; cervical, A critique of, abs., 308; or hebosteotomy, abs., 506
Calculi impacted in the portion of ureter which is situated in the bladder wall, Suprapubic transcystic removal of, 524
Cancer, of the uterus and its cure by the radical abdominal operation, 9; uterine, Consideration of the technique of the radical abdominal operation for, based upon an experience with forty-four cases, 152; and injury, Causal relationship between, trans., 189; of the cervix uteri, The ureter in, abs., 406; early diagnosis of, 434
Carcinoma, diverticulum and obliteration of the appendix, Clinical and pathological significance of, 211; scirrhous, of the ovary, trans., 499; cells, The action of placenta serum and that of the pregnant woman on, abs., 506
Celluloid splints and braces, non-inflammable, 77
Cervix uteri, in pregnant and parturient women, A new bag for the hydrostatic dilatation of, 296; The ureter in cancer of, abs., 406
Chicago Gynecological Society, Transactions, 168, 391, 496
Chicago Surgical Society, Transactions, 88, 298, 391, 596, 602
Chicago Urological Society, Transactions, 391
Chin, Plastic operation on in micrognathia, abs., 605
Chloroform, poisoning, Fibrinogen of the blood as influenced by the liver necrosis of, abs. 306; and blood during operation, Simple method of conservation of (Passive hyperæmia of the extremities), abs., 503
Cholecystitis, typhoidal, trans., 200
Chromoureteroscopy, The value of in functional kidney diagnosis, 345
Circumcision, New technique for, 488
Clinical Congress of Surgeons of North America, 87, 511, 610
Closure of the abdominal incision, 381
Common duct, Catheterization of as a practical and effective upper route for enteroclysis medication in toxic biliary cases (McArthur's procedure), trans., 185
Complement fixation test, Further experiments with (The placental theory of eclampsia), 451
Complications due to operative procedures, trans., 182
Congenital hip dislocation, Treatment of with the bloodless method, abs., 305

Congress, Second Clinical, of the Surgeons of North America, 87, 511, 610
Cord, Hernia into, or congenital umbilical hernia, with a new operative procedure, 526
Coxitic dislocations of early infancy, abs., 305
Cultivation of tissues in vitro and its technique, abs., 607
Curettement, Instrumental uterine perforation in, abs., 507
Cystoscope and the radiograph shadow, 374
Cysts, large ovarian, 115, trans., 184; of the pancreas, trans., 187; bilateral dermoid of the ovary, abs., 202

DECAPITATION of fœtus, New hook for, 206
Deformities of the face, cicatricial and congenital, Operative cure of, 24
Delivery, of the first arm in podalic version or breech presentation, A modification of the usual technique in, 85; Modern methods of in contracted pelvis, abs., 507
Depressor, new, prostatic, 590
Dermoid cysts of the ovary, bilateral, abs., 202
Desmoid tumors of the abdominal wall after operation, trans., 190
Diagnosis, early, of cancer, 434
Dilatation of the stomach, The Roux operation in, 74; acute postoperative, following gastrojejunostomy, 384
Disinfection, skin, Common fallacies regarding, with special reference to the iodine methods, 530
Dislocation, congenital, of the shoulder, abs., 304; congenital, hip, Treatment of with the bloodless method, abs., 305; of the scaphoid, trans., 602
Dislocations, Coxitic, of early infancy, abs., 305; and fractures of the nose, Surgery of, 579
Diverticula, intestinal, A pathological and clinical study of, abs., 90
Diverticulum, carcinoma and obliteration of the appendix, Clinical and pathological significance of, 211
Duodenum, Distension changes in, in chronic intestinal stasis, 221
Dystocia and kidney displacements, 20

ECLAMPSIA, Treatment of, 388; placental theory of (Further experiments with the complement fixation test), 451
Enteroclysis, apparatus, efficient, inexpensive, 166; medication in toxic biliary cases, Catheterization of the common duct as a practical and effective upper route for (McArthur's procedure), trans., 185
Epididymis, seminal vesicles and prostate, Tuberculosis of, trans., 391
Epulides, congenital (odontoblastomata), 357
Esophagus, New method for the cure of impassable benign stricture of (Transthoracic cardiotomy), 476
Exophthalmos, double pulsating, trans., 298
Exstrophy of bladder, Operative method for, 158
Extrauterine pregnancy in the early months, Principles and experience in the treatment of, abs., 408
Extremities, Passive hyperæmia of (A simple method of conservation of the blood and chloroform during operation), abs., 503

FACE, The operative cure of cicatricial and congenital deformities of, 24
Feet, painful, Four essentials in the treatment of, 47
Female pelvic floor, The anatomic repair of, 576
Femur, Transplantation of hip joint and upper third of, from the cadaver, abs., 305
Fever in malignant renal and adrenal tumors, abs., 504
Fibrinogen of the blood as influenced by the liver necrosis of chloroform poisoning, abs., 306
Fibroma, multiple, of the uterus — Porro at term, trans., 499
Fibromata, multiple, of the uterus, with a four and a half to five months' pregnancy, trans., 499
Flat foot, and pes valgus, Scoliosis ischiadica in, abs., 304; treatment of, based upon a new principle, abs., 305
Fluid, artificial synovial, 594
Fracture, vertebral (Insertion of a wire "back-stay") 295; of the knee cap, abs., 404; complete subaponeurotic patellar, 466; of the spine (gravity reduction), 494
Fractures, Observations upon the open treatment of, 162; of the mandible, 489; transverse, of the patella, without separation of the fragments, abs., 505; and dislocations of the nose, Surgery of, 579
Functions of the great omentum, 117
Fundus, abdominal exclusion of in complete procidentia, 160

GALL-BLADDER, The importance of preserving, trans., 178
Gastrojejunostomy, Acute postoperative dilatation of the stomach following, 384
Generative organs, female, The relation of the thyroid gland to, 457
Goiter operations, An improved technique in, 79
Gonococcal infections of the kidney, 331
Great Britain, Surgeons of, and operations performed by them as witnessed by members of American Clinical Society (Lantern slide exhibit), trans., 187
Gynecology and obstetrics, Hypoplasia and infantilism in, abs., 309

HÆMORRHAGE, of the newborn, Treatment by direct transfusion of blood, 40; postpartum, Treatment of, abs., 207; uterine, The ovary an etiologic factor of, abs., 406
Hebosteotomy or Cæsarean section, abs., 506
Hæmolytic streptococci, The importance of lecithin for the differentiation of different species among, abs., 95; substances in the placenta, The proof of, abs., 308
Hemostasis, permanent, The use of the Blunk hemostatic forceps for, abs. 608
Hernia, inguinal, The selection of operation for, trans., 199; congenital umbilical, or hernia into the cord, with a new operative procedure, 526; inguinal, of the urinary bladder, 542
Hernial tuberculosis, 270, trans., 301
Hip, congenital dislocation, Treatment with the bloodless method, abs., 305; joint and upper third of femur, Transplantation of from the cadaver, abs., 305; joint, Lesions of and their management, trans., 200
Hook, new, for decapitation of fœtus, 296
Hydrarthrosis, intermittent, 365
Hyperæmia, passive, of the extremities — a simple method of conservation of the blood and chloroform during operation, abs., 503
Hypoplasia and infantilism in obstetrics and gynecology, abs., 309

ICTERUS, The pathogenesis of, abs., 606
Ileum, The significance of the Lane kink of, 34; terminal, Intestinal obstruction due to kinks and adhesions of, 227
Ileus, volvulus and incarceration of the stomach, abs. 608
Incision, abdominal, The closure of, 381
Incontinentia vesicæ, congenital, The operative treatment of, abs., 307
Infancy, early, Coxitic dislocations of, abs., 305; pyloric stenosis in, 568, trans., 597

Infantilism and hypoplasia in obstetrics and gynecology, abs., 309
Infants, vaginal secretion in, abs., 203
Inflammation, chronic purulent, The treatment of with Beck's bismuth paste, abs., 505
Inflammatory tumors of the abdomen simulating malignant disease, 102
Injuries to the kidneys with end results, 109; to the semilunar cartilages of the knee-joint, abs., 405; to the spleen, Diagnosis of, abs., 606
Injury and cancer, The casual relationship between, trans. 189
Intermittent hydrarthrosis, 365
Intestinal, diverticula, A pathological and clinical study, abs., 90; growth, malignant, requiring the removal of an unusual number of abdominal structures, trans., 184; obstruction, acute, Some suggestions relative to the preparatory, operative and postoperative treatment of cases of, trans., 186; stasis, chronic, Distension changes in the duodenum in, 221; obstruction due to kinks and adhesions of the terminal ileum, 227
Intestine, pneumatic rupture of (A new type of industrial accident), 63, trans., 88; small, A malignant lymphoma of, 72; strangulated, Testing the viability of, 528; trans., 597
Intracranial pressure in tumors and other brain diseases, The operative lowering of, abs., 307
Intussusception, trans., 182; The clinical aspect of, abs., 90; with special reference to adults, trans., 198
Iodine methods, Common fallacies regarding skin disinfection with special reference to, 530; sterilization for laparotomy field, abs. 608
Isthmus of the uterus, The problem of, abs., 407

JAW, Tumors of, trans., 188
Joint, hip, Lesions of and their management, trans., 200

KIDNEY, displacements and dystocia, 20; subparietal rupture of, Primary suture of, trans., 196; and ureter, Tuberculosis of, 324, trans., 391; gonococcal infections of, 331; functional diagnosis, The value of chromoureteroscopy in, 345; malignant papillary adenoma of, 353; tuberculosis of treated with nephrectomy, Researches as to the end results in twenty-five cases, 519
Kidneys, The value of phenolsulphonethalein in estimating the functional efficiency of, 56; injuries to, with end results, 109
Kinks and adhesions of the terminal ileum, Intestinal obstruction due to, 227
Knee, Immediate and permanent results of resection of in adults for tuberculous affections, abs., 405; cap, Fracture of, abs., 404; joint, Injuries to the semilunar cartilages of, abs., 405

LANE kink of the ileum, The significance of, 34
Lecithin, The importance of for the differentiation of different species among the hæmolytic streptococci, abs., 95
Leg, The treatment of varicose veins of with the spiral incision (after Rindfleisch-Friedel), abs., 606
Lip, lower, A new method in the making of, 492
Liver necrosis of chloroform poisoning, Fibrinogen of the blood as influenced by, abs., 306
Lung, The question of primary suture in cases of injury of, abs., 504
Lymphoma, malignant, of the small intestine. Partial intestinal obstruction; resection of the intestine containing the tumor; recovery; subsequent history, 72

MAGNESIUM ring blood-vessel anastomosis, Technique of, 477
Malformation, congenital, of the rectum, trans., 496
Malignancy, primary multiple, 112
Malignant disease, Inflammatory tumors of the abdomen simulating, 102
Mammæ of the axilla without nipple and ducts in the pregnant woman, Casuistic contribution to the question of the genesis of the "mammæ accessoriæ" and, abs., 407
Mammæ accessoriæ, and the so-called mammæ of the axilla without nipple and ducts in the pregnant woman, Casuistic contribution to the question of the genesis of, abs., 407
Mandible, Fractures of, 489
M'Arthur's procedure (Catheterization of the common duct as a practical and effective upper route for enteroclysis medication in toxic biliary cases) trans., 185
Mediastinum, Surgery of, trans., 194
Micrognathia, Plastic operation on chin in, abs., 605
Mucosa, uterine, Special reaction of following trauma (Artificial placentation of Loeb), abs., 203
Myoma, uterine, Studies of in its relation to conception, pregnancy, birth and parturition, abs., 206
Myomata of the uterus, Some observations on the operation of abdominal myomectomy for, 97
Myxo-sarcoma, omental, 588

NEPHROLITHIASIS, Diagnosis and treatment of, abs., 398
Newborn, Hæmorrhage of — Treatment by direct transfusion of blood, 40
Nose, Surgery of fractures and dislocations of, 579

OBLITERATION, carcinoma and diverticulum of the appendix, Clinical and pathological significance of, 211
Obstetrics and gynecology, Hypoplasia and infantilism in, abs., 309
Obstruction, acute intestinal, Some suggestions relative to the preparatory, operative and postoperative treatment of cases of, trans., 186; intestinal due to kinks and adhesions of the terminal ileum, 227
Odontoblastomata (Congenital epulides), 357
Omental myxo-sarcoma, 588
Omentum, great, Functions of, 117; exhibition of a tag of, trans., 596; greater, Torsion of, abs., 605
Operation, Passive hyperæmia of the extremities — a simple method of conservation of the blood and chloroform during, abs., 503
Operations, combined abdominal and pelvic, A position for saving time in, trans., 183
Operative procedures, Complications due to, trans., 182
Orthopedic surgery, Department of, 87
Osmosis as an important factor in the action of antiseptics, 262
Osteomyelitis, trans., 190
Ovarian cysts, large, 115, trans., 184
Ovaries, tubes and bladder, Tuberculosis of, 341, trans., 391; uterus and tubes removed, Postmortem about ten days after labor, trans., 499
Ovary, Bilateral dermoid cysts of, abs., 202; an etiologic factor of uterine hæmorrhage, abs., 406; scirrhous carcinoma of, trans., 499

PAINFUL feet, Four essentials in the treatment of, 47
Palate defect after infancy, Operative treatment of difficult cases of, 289
Pancreas, Cysts of, trans., 187; diseases of, abs., 608
Paraplegia, Pott's, abs., 404

Parturient and pregnant women, A new bag for the hydrostatic dilatation of the cervix uteri in, 296
Parturition, birth, pregnancy and conception, Studies of the uterine myoma in its relation to, abs., 206
Patella, Transverse fractures of without separation of the fragments, abs., 505
Patellar fracture, complete subaponeurotic, 466
Pellagra, Transfusion in, trans., 188
Pelvic, organs, After-results of abdominal operations on, abs., 92; and abdominal operations combined, A position for saving time in, trans., 183, 585; floor, female, The anatomic repair of, 576
Pelvis, contracted, Modern methods of delivery in, abs., 507
Perforation, instrumental uterine in curettement, abs., 507
Peritonitis, acute free suppurative, 50; in the service of Dr. Joseph Price, 562
Pes valgus and flat foot, Scoliosis Ischiadica in, abs., 304
Phenolsulphonethalein, The value of in estimating the functional efficiency of the kidneys, 56
Physiotherapy, Sciatica and its, abs., 305
Placenta, The proof of hæmolytic substances in, abs., 308; serum and that of the pregnant woman, The action of on carcinoma cells, abs., 606
Placenta prævia, 546
Placental theory of eclampsia — Further experiments with the complement fixation test, 451
Plication of the anterior broad ligament for retrodisplacements, trans., 200
Pneumatic rupture of the intestine — A new type of industrial accident, 63, trans., 88
Poisoning, chloroform, Fibrinogen of the blood as influenced by the liver necrosis of, abs., 306
Polyuria, traumatic, abs., 504
Postmortem Cæsarean section, Legal aspects of, trans., 168
Postpartum hæmorrhage, Treatment of, abs., 207
Pott's paraplegia, abs., 404
Pregnancy, extrauterine in the early months, Principles and experience in the treatment of, abs., 408; primary abdominal in a rabbit, 471; four and a half to five months', Multiple fibromata of the uterus with, trans., 499
Pregnant, Tetany of the, abs., 206
Procidentia, complete, Abdominal exclusion of the fundus in, 160
Proctoclysis apparatus, Speedometer for, 166
Prostate, seminal vesicles and the epididymis, Tuberculosis of, trans., 391
Prostatic, sarcoma, Radium treatment of, abs., 307; depressor, new, 590
Puerperal sepsis, postabortum, by staphylococcus aureus hæmolyticus, abs., 508
Puerperium, The bradycardia of, 441, trans., 500
Pulsating exophthalmos, double, 298
Pyloric stenosis in infancy, 568, trans., 597
Pylorospasm, trans., 188
Pylorus, Congenital hypertrophic stenosis of, abs., 90

RABBIT, Primary abdominal pregnancy in, 471
Radical abdominal operation for uterine cancer based upon an experience with forty-four cases, Technique of, 152
Radiograph, stereoscopic, as an aid to the surgeon, 1; shadow and the cystoscope, 374
Radiography of the urinary organs, An aid to, 167
Radium treatment of a prostatic sarcoma, abs., 307
Rectum, Congenital malformation of, trans., 496
Relaxation, sacro-iliac, 411
Renal, artery, Some experiments on, 46; tuberculosis, Early diagnosis and treatment of, trans., 180; and vesical tuberculosis, Operative and specific treatment of, 311; and adrenal tumors, malignant, Fever in, abs., 504
Resection, of long pipe bones, Bone plasty after, abs., 304; of knee in adults for tuberculous affections, Immediate and permanent results of, abs., 405
Retrodisplacements, Plication of the anterior broad ligament for, trans., 200
Retroperitoneal space, Suppuration in, 276
Rib, Transplantation of, abs., 605
Round ligaments, Ventrosuspension by for backward and downward displacement of the uterus, 378
Roux operation in dilatation of the stomach, 74
Rupture, pneumatic, of the intestine, 63, trans., 88; subparietal of the kidney, Primary suture of, trans., 196

SACRO-ILIAC relaxation, with analysis of eighty-four cases, 411
Sarcoma, Primary, of the appendix, 131, trans., 193; prostatic, The radium treatment of, abs., 307
Scaphoid, Dislocation of, trans., 602
Sciatica and its physiotherapy, abs., 305
Scoliosis, structural, Treatment of, abs., 304; relieved by operation on one of the transverse processes, abs., 304
Scoliosis ischiadica in flat foot and pes valgus, abs., 304
Semilunar cartilages of the knee joint, Injuries to, abs., 405
Seminal vesicles, prostate and epididymis, Tuberculosis of, trans., 391
Sepsis, postabortum puerperal by staphylococcus aureus hæmolyticus, abs., 508
Septic uterus, Extirpation of, abs., 507
Serum, placenta, and that of the pregnant woman, The action of on carcinoma cells, abs., 606
Shoulder, Congenital dislocation of, abs., 304
Skin disinfection, Common fallacies regarding with special reference to the iodine methods, 530
Societies, Transactions of
Chicago Gynecological Society, 168, 391, 496
Chicago Surgical Society, 88, 298, 391, 596, 602
Chicago Urological Society, 391
Clinical Congress of Surgeons of North America, 87, 511, 610
Southern Surgical and Gynecological Assn., 178
Western Surgical Assn., 190
Southern Surgical and Gynecological Assn., Transactions, 178
Speedometer for proctoclysis apparatus, 166
Spinal cord, Complete transverse destruction of, trans., 183
Spine, fracture of (gravity reduction), 494
Spleen, Diagnosis of injuries to, abs., 606
Splints and braces, non-inflammable celluloid, 77
Staphylococcus aureus hæmolyticus, Case of postabortum puerperal sepsis by, abs., 508
Stasis, chronic intestinal, Distension changes in the duodenum in, 221
Stenosis, congenital hypertrophic of the pylorus, abs., 90; congenital of the ureter, 533, trans., 602; pyloric in infancy, 568, trans., 597
Sterilization of the woman, Temporary, abs., 95; iodine for laparotomy field, abs. 608
Stereoscopic radiograph as an aid to the surgeon, 1
Stitch, button hole, Finishing, 78, 397
Stomach, the Roux operation in dilatation of, 74; acute postoperative dilatation of following gastrojejunostomy, 384; ileus, volvulus and incarceration of, abs., 608

Stones, in the ureter. 134; in the pelvic portion of the ureter, The clinical picture and treatment of, abs., 504
Strangulated intestine, Testing the viability of, 528, trans., 597
Streptococci, hæmolytic, The importance of lecithin for the differentiation of different species among, abs., 95
Stricture, impassable benign of the esophagus, A new method for the cure of (Transthoracic cardiotomy), 476
Suppuration in the retroperitoneal space, 276
Suprapubic operations, The best method of exposing the interior of the bladder in, 30, trans., 180
Surgeons of North America, The second clinical congress, of, 87, 511, 610; of Great Britain, and operations performed by them (Lantern slide exhibit), trans., 187
Suture, primary, The question of in cases of injury of the lung, abs., 504
Synovial fluid, artificial, 594

TERATOMA testis and its derivatives, 230
Testicle, undescended, The surgical treatment of, 283, trans., 299
Testis, teratoma, and its derivatives, 230
Tetany of the pregnant, abs., 206
Thrombophlebitis, continued, Death from, 82
Thrombosis postabortum; excision of the thrombosed left ovarian vein; hysterectomy; death from continued thrombophlebitis, 82
Thyroid gland, Relation of to the female generative organs, 457
Thyroidectomy, Collapse of the trachea while performing, trans., 185
Tissues, Cultivation of in vitro and its technique, abs., 607
Tonsillitis, Chronic urethritis and chronic ureteritis caused by, trans., 179
Torsion, of the uterus, abs., 203; of the greater omentum, abs., 605
Trachea, Collapse of while performing thyroidectomy, trans., 185
Transfusion in pellagra, trans., 188
Transplantation of hip joint and upper third of femur from the cadaver, abs., 305
Transthoracic cardiotomy, A new method for the cure of impassable benign stricture of the esophagus, 476
Transverse processes, A case of scoliosis relieved by operation on, abs., 304
Trauma, Special reaction of uterine mucosa following (Artificial placentation of Loeb), abs., 203
Traumatic polyuria, abs., 504
Tuberculosis, renal, The early diagnosis and treatment of, trans., 180; hernial, 270, trans., 301; renal and vesical, The operative and specific treatment of, 311; of the kidney and ureter, 324, trans., 391; of the tubes, ovaries and bladder, 341, trans., 391; of the prostate, seminal vesicles and the epididymis, trans., 391; of the kidney treated with nephrectomy, Researches as to the end results in 25 cases of, 519
Tuberculous affections, Immediate and permanent results of resection of the knee in adults for, abs., 405
Tubes, ovaries and bladder, Tuberculosis of, 341, trans., 391; ovaries and uterus removed, trans, 499
Tumors, inflammatory of the abdomen simulating malignant disease, 102; of the jaw, trans., 188; desmoid, of the abdominal wall after operation, trans., 190; and other brain diseases, The operative lowering of intracranial pressure in, abs., 307; malignant renal and adrenal, Fever in, abs., 504
Typhoidal cholecystitis, trans., 200

UMBILICAL hernia, congenital, or hernia into the cord, with a new operative procedure, 526
Undescended testicle, The surgical treatment of, 283, trans., 299
Ureter, Stone in, 134; and kidney, Tuberculosis of, 324, trans., 391; in cancer of the cervix uteri, abs., 406; The clinical picture and treatment of stones in the pelvic portion of, abs., 504; Suprapubic transcystic removal of calculi impacted in the portion of, which is situated in the bladder wall, 524; congenital stenosis of, 533; trans., 602
Ureteritis and urethritis, chronic, caused by tonsillitis, trans, 179
Urethritis and ureteritis, chronic, caused by tonsillitis, trans., 179
Urinary, organs, An aid to radiography of, 167; infections, The results obtained by autogenous vaccines in, abs., 503
Uterine, cancer, Consideration of the technique of the radical abdominal operation for, based upon an experience with forty-four cases, 152; mucosa, Special reaction of following trauma (Artificial placentation of Loeb), abs., 203; myoma in its relation to conception, pregnancy, birth and parturition, abs., 206; hæmorrhage, The ovary an etiologic factor of, abs., 406; perforation, instrumental, in curettement, abs., 507
Uterus, Cancer of, and its cure by the radical abdominal operation, 9; Some observations on the operation of abdominal myomectomy for myomata of, 97; torsion of, abs., 203; Ventrosuspension by the round ligaments for backward and downward displacement of, 378; Problem of the isthmus of, abs., 407; ovaries and tubes removed, trans., 499; multiple fibroma of, trans., 499; multiple fibromata of, with a four and a half to five months' pregnancy, trans., 499; septic, Extirpation of, abs., 507

VACCINES, autogenous, The results obtained by in various urinary infections, abs., 503
Vagina, new, Formation of, trans., 182; total absence of, abs., 202
Vaginæ, adenomatosis, abs., 406
Vaginal secretion in infants, abs., 203
Varicose veins of the leg, Treatment of with the spiral incision (after Rindfleisch-Friedel), abs., 606
Veins, varicose of the leg, Treatment of with the spiral incision (after Rindfleisch-Friedel), abs., 606
Ventrosuspension by the round ligaments for backward and downward displacement of the uterus, 378
Version, podalic or breech presentation, A modification of the usual technique in the delivery of the first arm in, 85
Vertebral fracture, Insertion of a wire back-stay, 295
Vesicæ, congenital incontinentia, The operative treatment of, abs., 307
Vesical and renal tuberculosis, The operative and specific treatment of, 311
Volvulus, of the cæcum, trans., 187; ileus and incarceration of the stomach, abs., 608

WESTERN Surgical Assn., Transactions, 190
Wiring, Bone, with a new material of great tensile strength, 79
Woman, Temporary sterilization of, abs., 95

X-RAY, Definite knowledge obtained by means of trans., 195

INDEX TO BOOK REVIEWS

Anatomical and Surgical Study of Fractures of the Lower End of the Humerus. Astley Paston Cooper Ashhurst, 208

Andreas Vesalius, the Reformer of Anatomy. James Moores Ball, 510

Bismuth Paste and Chronic Suppurations. Its Diagnostic Importance and Therapeutic Value. Emil G. Beck, 609

Constipation and Intestinal Obstruction. Samuel Goodwin Gant, 509

Diagnosis and Treatment of Diseases of Women. Harry Sturgeon Crossen, 409

Difficult Labor. G. Ernest Herman, 409

Diseases of the Pancreas. Second Edition. Eugene L. Opie, 410

Epoch Making Contributions to Medicine, Surgery, and the Allied Sciences. Collected by N. C. B. Camac, 609

Fractures and Separated Epiphyses. Albert J. Walton, 409

Fractures and their Treatment. J. Hogarth Pringle, 95

Gynecological Diagnosis. Walter L. Burrage, 310

Hookworm Disease; Etiology, Pathology, Diagnosis, Prognosis, Prophylaxis, and Treatment. George Dock and Charles C. Bass, 96

Introduction to Surgery. Rutherford Morison, 208

Lippincott's New Medical Dictionary. Henry W. Cattell, 609

Manual of Obstetrics. A. F. A. King, 509

Medical Chaos and Crime. . Norman Barnesby, 310

Obstetrical Nursing for Nurses and Students. Second Edition. Henry Enos Tulley, 510

Obstetrics. The Practical Medicine Series. Volume V. Edited by Joseph B. DeLee with the collaboration of Herbert M. Stowe, 409

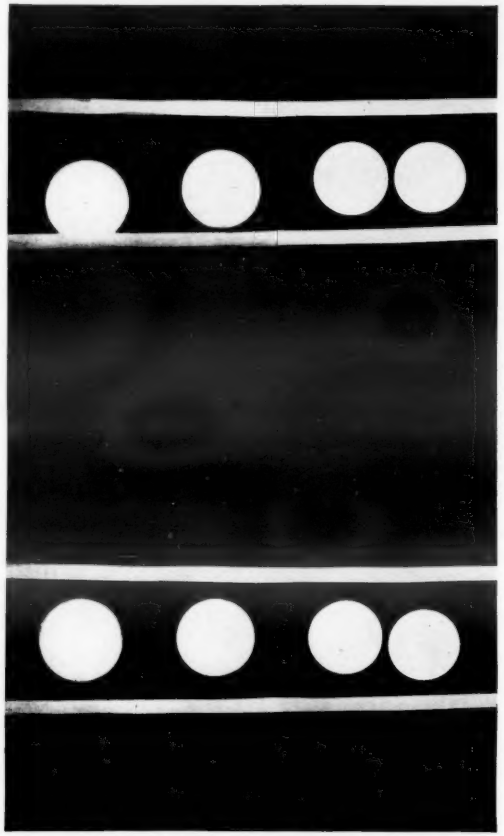
Operative Surgery for Students and Practitioners. Third Edition. John J. McGrath, 510

Papyrus Ebers. The First Medical Book. Translated from the Original with Comparative, Illustrated and Commentary Notes by Carl von Klein, 96

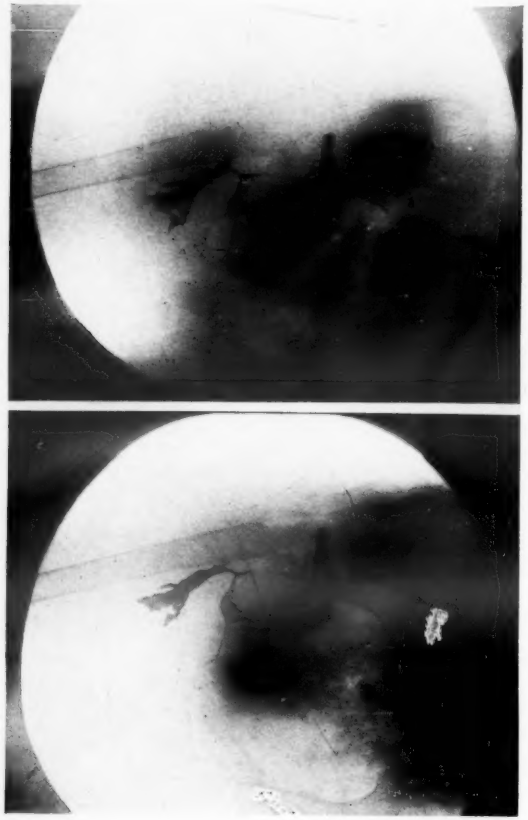
Text-Book of Bacteriology. Philip Hanson Hiss, Jr., and Hans Zinsser, 410

3. Fracture of radius and ulna. Note direction of displacement.

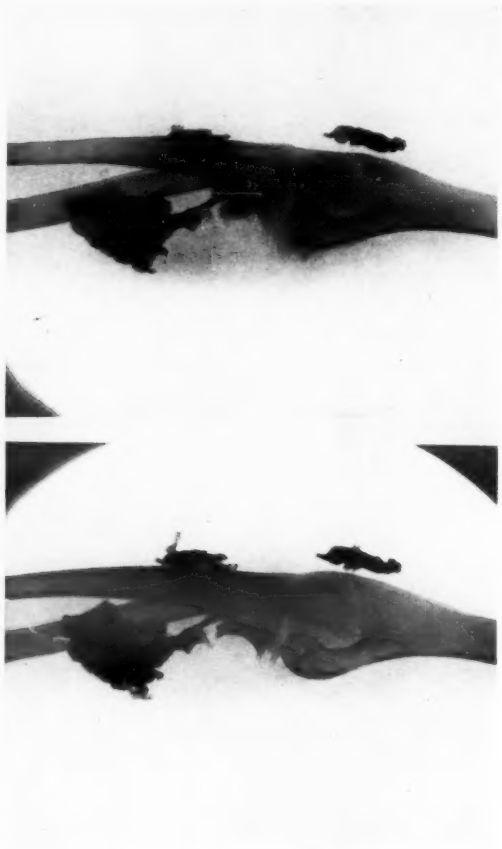
2. Distortion of length of nails corrected by stereoscope.



1. True optical view illustrated by coin experiment. Note return of coins to equal size.

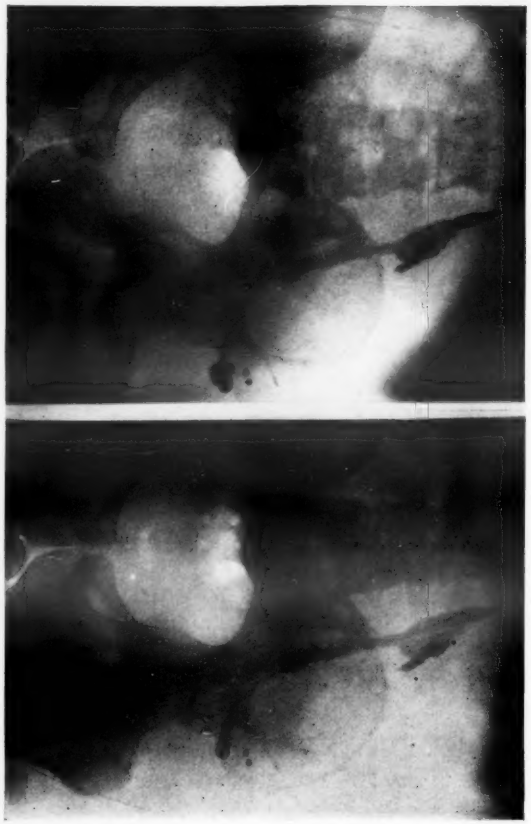


6. Rectal fistula, originating from hip-joint disease. A, perirectal abscess; B, narrow channel communicating with abscesses in hip-joint.

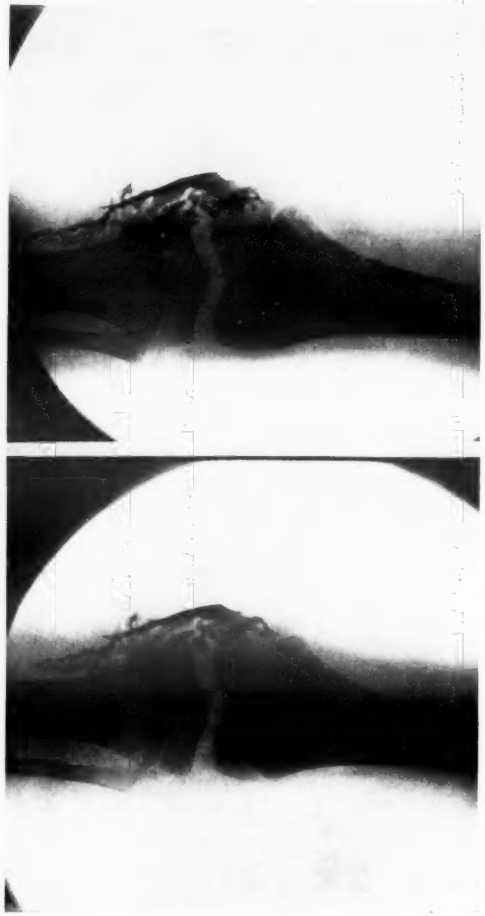


5. Multiple tuberculous abscesses of elbow, injected with bismuth paste.

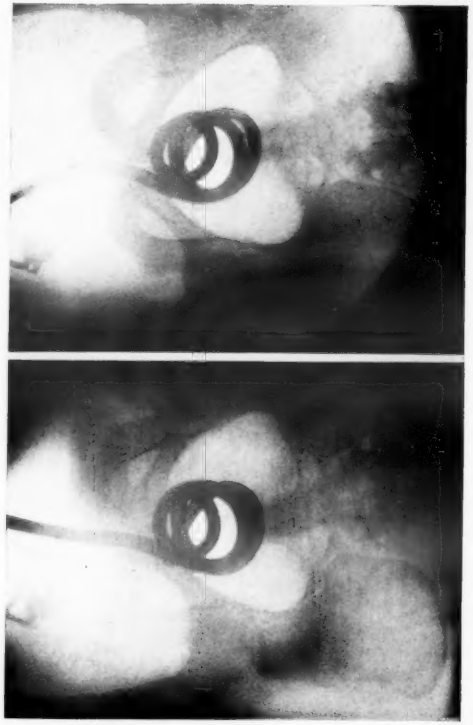
4. Sarcoma. Note the destruction of outer wall of radius.



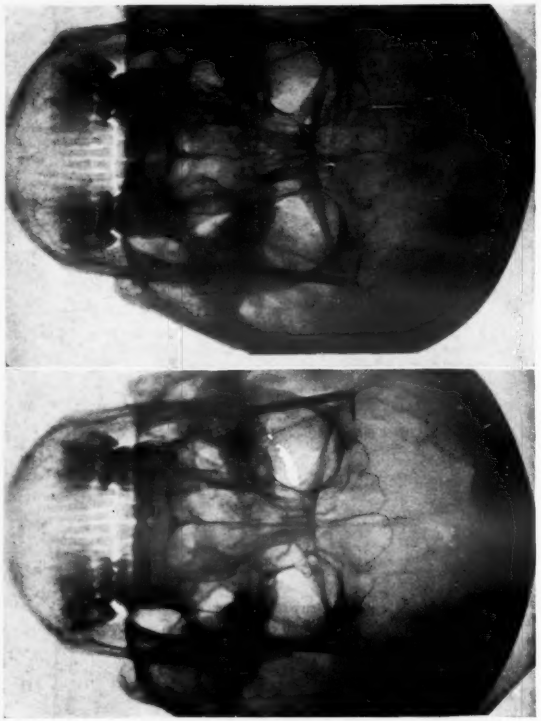
9. Tuberculosis of sacrum, mistaken for hip-joint disease. Diagnosis corrected through stereoradiograph.



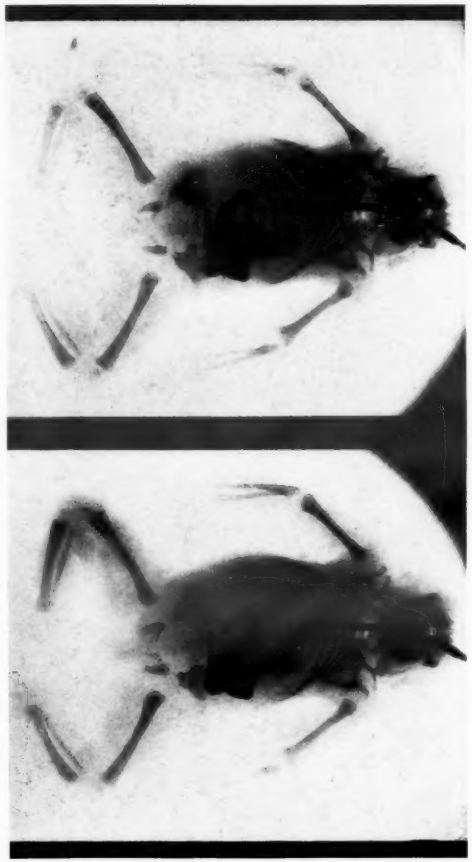
8. Subfascial multilocular abscess, mistaken for tuberculous arthritis.



7. Coiling up of the rectal tube after insertion into rectum.



12. Anatomical study of accessory sinuses by means of stereoscopic radiograph.



11. Pseudencephalus, showing position of stomach and intestines by injection of bismuth paste. Note absence of air in lungs.

10. Empyema, shown in stereoscope to occupy only posterior part of the pleural space.

Fig. XIII

Bismuth paste rubbed into skin, showing furrows.

Fig. XIV.

Arteries of Foot injected with Bismuth paste.

Fig. XV.

Showing exact location of Lead remnants in ring finger.

SURGERY, GYNECOLOGY AND OBSTETRICS

AN INTERNATIONAL MAGAZINE, PUBLISHED MONTHLY

VOLUME XII JANUARY, 1911 NUMBER 1

THE STEREOSCOPIC RADIOGRAPH AS AN AID TO THE SURGEON[1]

BY EMIL G. BECK, M. D., CHICAGO, ILLINOIS
Surgeon to the North Chicago Hospital

THE scope of radiography as a diagnostic aid has found its way into nearly all branches of surgery and medicine. The number of subjects illustrated by radiographs in our latest text-books on surgery and medicine as compared with ten years ago indicates its utility. We now diagnose fractures, dislocations, diseases of bones and joints, locate foreign bodies, stones in the kidney and bladder, trace sinuses, and outline abscess cavities, etc. We can estimate enlargements of the heart, liver, and spleen, diagnose dilatation of the stomach, enteroptosis, carcinoma, assist in the diagnosis of pulmonary tuberculosis, pleural effusions, etc. In fact, the radiograph has now become a diagnostic agent so useful as to be almost indispensable.

Nevertheless, there exists among surgeons and general practitioners an undercurrent of skepticism as to its real value. We still hear too often the assertion in medical discussions that the radiograph, instead of having aided the surgeon, has misled him in his diagnosis. What is the cause of this skepticism? My reply is: *The difficulty of correct interpretation of the radiogram.* The most perfect radiogram is worthless unless correctly interpreted. If photographic perfection were the only requisite in making radiography a faultless diagnostic method, its mission would already be fulfilled, for no one can find any fault with the excellent work done by radiographers at the present time. Technical perfection, however, is not the only requisite. "Something more" is necessary, and this "something" is "correct interpretation."

The clinician often hesitates to accept the radiographer's diagnosis, believing him to be too enthusiastic and inclined to accommodate his interpretation to suit the individual case. The radiographer is certainly at a disadvantage in not being familiar with the history of the case, and in not having made a physical examination of the patient; and it is asking too much to expect him to give a definite and correct diagnosis from the plate alone. The physician, on the other hand, who is familiar with the history and symptoms of the case, as a rule lacks the ability to read X-ray pictures, a qualification which can be obtained only by experience. The interpretation of shadows is somewhat difficult even for the expert, and occasionally even impossible. Therefore, the general practitioner, who has not had opportunity to study the interpretation of many radiographs, is unable to control the possible errors of misinterpretation. The clinician may, therefore, be excused for his reluctance. He does not wish to employ a method which leaves room for possible error over which he has no control. Where the clinician is also trained in reading radiographs, the problem is solved, but only few clinicians have the opportunity to become proficient in this branch, and thus we must

[1] Read before the Chicago Surgical Society, January, 1911.

devise a method which will make interpretation a simple matter for everyone.

To assist in solving this problem we must ask ourselves these two questions:

1. Why is the interpretation so difficult?
2. What can we do to simplify it?

My answer to question 1 is: *The distortion of shadows in a single plate makes correct interpretations difficult*, as will be shown further on in this paper.

In answer to question 2, I suggest that *stereoscopic radiographs* be employed as a means of simplifying correct interpretation. I shall try to convince even the skeptic of the great advantage of the stereoscopic method over that of the single plates.

DISADVANTAGES OF SINGLE RADIOGRAMS

The single radiogram is merely a shadow picture of the objects between the anode of the X-ray tube and the sensitive plate. The physical laws which govern the production of the shadows are as infallible as the law of gravitation. Each shadow has its corresponding cause. An object of certain size, certain density, and certain distance from the sensitive plate will produce a shadow of certain size and contour. In the single plate the shadows produced by pathological lesions within the body appear all in one plane, namely, on the surface of the X-ray plate, so that one is unable to judge at what depth the lesion producing a certain shadow is located. Moreover, if the object radiographed does not lie directly on the sensitive plate, its shadow will be magnified and this magnification increases as the distance between the object and the sensitive plate increases. For instance: A lesion the size of a hazelnut, located on the posterior part of the lung, will give a distinct shadow not much larger than the actual size of the lesion, while the same lesion located on the anterior part of the lung will produce a shadow double its actual size, but much less distinct in outline. The nearer the lesion to the plate, the more distinct will be the shadow. Overlapping shadows produced by two or more lesions which happened to be in line with the source of the rays will appear on the plate as one single shadow, but naturally somewhat intensified.

It is difficult in a single plate to judge the length of foreign bodies, such as needles or nails. They may appear on the plate as single dots when, in fact, they may be several inches long. It all depends upon the angle at which they were placed during the exposure. It is true that fractures and dislocations may be diagnosed by a single plate, but the direction of the displacement cannot be estimated unless side views are taken.

How is one to make accurate deductions when there are so many confusing factors in the single plate?

ADVANTAGE OF STEREOSCOPIC RADIOGRAPHY

My aim is to show that in this method lies the possibility of solving the problem of correct interpretation. Four years ago I began to use stereoscopic radiographs, and during the past three years we have adopted this method and use it almost exclusively in our diagnostic work at the North Chicago Hospital. It has facilitated the interpretation of radiographs to such an extent that I am convinced that it has a most promising future.

The method consists, as we know, of taking two separate skiagraphs of the same region of the body from two different points without changing the position of the patient between the two exposures. After the plates are developed they are placed side by side and viewed by means of a pair of prisms, and thus the stereoscopic effect is obtained. Special stereoscopes are built for the inspection of these plates.

To one who has had no experience with stereoscopic work, the idea of taking two pictures instead of one, to double the patient's expense, and the erroneous impression that the technique is difficult, this method may appear cumbersome and impractical, but I can assure him that once acquainted with it these objections will disappear.

The stereoradiograph overcomes practically all of the shortcomings of the single plate. The fusion of the two pictures into one by means of the stereoscope builds up a plastic translucent body resembling a glass model, in which all structures can be plainly distinguished. The radiograph really ceases to be a shadow.

The plastic effect produces clearer outlines of structure and all parts stand out distinctly so that the distance between them can be estimated. The bones become more translucent and their convexities or concavities are seen with striking clearness. Lesions within the chest are easily located and their density and contour are determined without difficulty.

The magnification of shadows which is the fault of single radiographs, due to oblique exposures or to unequal distances of lesions from the plate, is corrected in the stereoscopic radiograph, because the latter produces a true optical view.

FIG. 1. *True optical view illustrated by coin experiment.* A convincing illustration of this fact is seen when the stereoscopic card (Fig. 1) is viewed. It represents four coins (American half dollars, which, of course, are all the same size), placed side by side on the plate, each coin, however, being placed at a different level from the X-ray plate, supported at the different heights by various thicknesses of cotton. The first coin is directly on the plate, the second is one inch higher, the third two inches, and the fourth is three inches above the plate. Two strips of tin foil are also placed flatly upon the X-ray plate along the border of the set of coins, in order to furnish a base line indicating the level of the X-ray plate.

In the single plate the differences in the sizes of the coins, due to spreading of the shadow, is quite apparent, the difference of shadow density is also quite perceptible and all four coins appear to lie directly on the plate.

Quite another picture is obtained when these coins are viewed with the stereoscope. Instantly all four return to their equal sizes, and each coin is shifted into its respective depth, so that their relative distance from one another is perfectly plain. This simple experiment proves that in all stereoscopic radiographs the magnification of shadows is corrected, and that by means of the stereoscope we obtain the true relation of sizes of the objects radiographed.

One point, however, must not be forgotten, namely, that the plates must be properly placed before inspection. The pictures must be viewed in the same position in which they were taken. In other words, if a body was taken dorso-ventrally, it must be viewed dorso-ventrally, otherwise we obtain a false or pseudoscopic view. The reason for this has been explained in my article published in the September, 1910, number of the American Quarterly of Roentgenology.

FIG. 2. *Correction of distortion of length.* This figure gives a lucid illustration that the single radiograph may deceive us in estimating the length of certain objects, such as nails or needles.

Five iron nails of exactly equal sizes are stuck in a wax base, each at a different angle. The horizontal nail lies flatly on the wax tablet; the other four are placed at different angles, so that the fifth stands perfectly vertical. A single radiograph of these five nails produces shadows of various lengths. The horizontal nail throws a shadow practically the actual length of the nail, while the vertical produces a round spot, corresponding to the size of the head of the nail. The intermediate three give varying lengths of shadows, the length depending upon the angle at which they stood during the exposure.

Unless one is familiar with the details of this experiment, he might be misled by the picture of the single plate, and assume that five nails of different sizes were radiographed. A stereoscopic view makes such a mistake impossible. It shows with perfect clearness the fanlike rise of the nails from the horizontal to the vertical, and one sees the actual picture of the nails and not their shadows.

FIG. 3. *Fractures and dislocations.* To ascertain whether a fracture is really present, the single radiograph is quite sufficient, but to make a correct anatomical diagnosis of a fracture, in other words, to ascertain the direction of the displacement of fragments, it is wholly inefficient. The stereoradiograph fills the latter requirement most beautifully. I illustrate this in stereoradiograph, in which both the radius and ulna are completely fractured and the fragments dislocated. The single plates show the fracture clearly enough, but does not inform us of the direc-

tion of the displacement. A lateral view would be necessary to ascertain this. In our stereoscopic view we can diagnose with precision the exact angles and relative positions of the displaced fragments. I am certain that a view of this one example would convince any surgeon of the practical value of this method of anatomical diagnosis of fractures; all that is necessary is to convince him that he can also obtain the pictures. It is unnecessary to state that in dislocations of joints the same advantages are to be obtained.

DISEASES OF BONES AND JOINTS

In this class of affections we have made the most extensive use of stereoscopic radiography, and I could illustrate several hundred interesting cases which have proven the advantages mentioned, but one or two typical cases will suffice to interest even the most skeptical.

FIG. 4. *Sarcoma of radius.* This radiograph shows in plastic effect the sarcomatous degeneration of the end of the radius. The outer shell is not dense, as we find it in the bone cyst and the medullary space is not traversed with bony trabeculæ. In fact, it shows that the disease has already destroyed the outer wall and invaded the soft structures, thus pointing to a diagnosis of sarcoma.

Other diseased conditions, such as sequestra, can be most satisfactorily located by means of the stereoscopic radiograph. Indistinct shadows of the single plates will melt into well-defined bodies, leaving no doubt as to their identification as sequestra. My brother, Dr. Carl Beck, of Chicago, has brought out this fact in a previous publication of this journal.

SINUSES AND ABSCESS CAVITIES

These can be traced by previously injecting them with a liquefied bismuth-vaselin paste, and then taking a radiograph. The single pictures give a clear outline of all ramifications of these channels and often lead to the original focus of the disease, but we cannot judge from them the relation of a particular sinus to the surrounding structures. In other words, *we cannot tell whether a sinus runs in front, behind, or through a bone.* A stereoscopic picture clears up our doubts at once. In my former publications I have furnished several examples of this fact, and I wish to add here some examples which are of special interest.

FIG. 5. *Multiple abscesses due to tuberculosis of the elbow.* This stereoscopic radiograph demonstrates the fact that several abscesses may originate from one focus of disease without any communication between them. These cold abscesses were opened, at once injected with bismuth paste, and radiographs taken. The inspection of this stereoscopic picture shows in plastic effect what the single fails to show, namely, the relation of the abscesses to the bones of the arm, and proves that an *abscess is not always a round bag without recesses, but that it is often an irregular pocket with many diverticula,* which at times burrow deeply into the soft tissues. After an abscess has been discharged of its contents, it usually shrivels to a narrow channel and forms a sinus or a fistulous tract.

FIG. 6. *Rectal fistula originating in hip-joint.* This stereoscopic radiograph is especially instructive. It shows a system of abscesses and communicating sinuses, all of which originated in the tuberculous hip-joint. The pus entered through the pelvis through a channel beneath the anterior superior spine of the ilium and perirectal abscess formed (*a*) which later ruptured into the rectum. From the single radiograph no one could make the deduction that this abscess is within the pelvis. An identical shadow could have been produced by injecting a quantity of paste underneath the skin. By means of the stereoscope, however, the abscess is shown to be located in the center of the pelvic basin, and a mistake as to its correct location is almost impossible. The narrow channel (*b*) which communicates with the larger abscess near the joint runs a backward course and thus on the single plate appears to be a very short channel. The stereoscopic view corrects this deception by permitting us to estimate the length of the sinus and also its direction, by comparing its relation to the surrounding structure. *Les-*

son: A rectal fistula may originate even from hip-joint disease.

FIG. 7. *Coiling of the rectal tube after insertion.* At this point I desire to show a stereoscopic picture which demonstrates the fact that a rectal tube when inserted high into the rectum is likely to coil itself up, instead of passing into the sigmoid or ascending colon.

This has been shown by Lilienthal, Soper, Haines, and Yates, with illustration of single radiograms, but here we can study the condition a little closer. We can see the anteroposterior diameter of the pelvis as well as the lateral, and the direction of the different windings of the coil.

I have chosen to use a new and very firm soft rubber tube, in order to prevent kinking, which often happens with old tubes which through repeated boiling have lost their elasticity.

This experiment teaches that the mere insertion of the larger part of the rectal tube does not insure its passage into the upper portion of the bowel. a factor quite important in high rectal enema or rectal feeding.

FIG. 8. *Diagnostic error corrected by stereoradiograph.* A Chicago boy, five years old, always in perfect health, fell on his knee while on a trip in California and developed about a month later a diffuse, painful swelling involving the entire knee. The symptoms and the appearance of the knee were so suggestive of tuberculous knee-joint that the physician in charge pronounced it as such and advised immediate operation. The parents, quite distressed, interrupted their trip and brought the boy home to Chicago, expecting that their only child would have to have a resection of the joint. By the time they arrived in Chicago an abscess had already ruptured and a sinus discharged a small quantity of pus, but the knee was still swollen and very painful.

In this condition the boy was brought to me for treatment. The sinus was injected with bismuth paste and the radiograph (Fig. 8) disclosed the fact that the joint was not at all involved, as had been suspected, and that the entire condition was extra-articular. An arborlike system of connecting sinuses and small abscess cavities surrounded the joint, but none entered into the articulation.

The sinus healed promptly after the injection and the pain and swelling disappeared, so that the boy could skip on the limb without any discomfort.

Six months later another stereoradiograph was taken, which shows a perfectly normal knee-joint, all paste absorbed and not the slightest evidence of any healed-out bone or joint disease.

The lesson derived from this case is a practical one: "Never excise a knee-joint unless a stereoradiograph has proven that the disease is extensive and involving the joint."

FIG. 9. *Tuberculosis of sacrum, mistaken for hip-joint disease, correctly diagnosed by stereoradiograph.* E. E., aged 22, six years ago developed an abscess below the right Poupart's ligament. Incision and drainage resulted in a sinus. Two years later two additional sinuses formed above Poupart's ligament. Contracture and fixation of the hip resulted. Six months later an abscess formed in the region of his right kidney, which ruptured and formed another sinus. The symptoms were so suggestive of hip-joint disease that the attending man was led to diagnose it as such.

With these sinuses discharging profusely for six years, he presented himself for treatment in November, 1910. An injection of bismuth paste and the radiograph cleared up the diagnosis. About one ounce of the paste was injected into the sinus below Poupart's ligament, and some escaped at once from the other three sinuses, thus proving that all communicated. The stereoscopic radiograph here shown (Fig. 9) clearly indicates that the disease originated in the sacrum and that the hip-joint is intact. For landmarks of the sinus openings I have used small buckshot. The paste was injected through the lowest opening where three buckshots show in the picture. It clearly outlines a sinus running upward in front of the hip-joint, but not entering it. A space of at least one inch exists between the paste and the joint. The course continues upward toward the two spots which represent the two openings above Poupart's ligament. From there the sinus

continues toward the fourth opening in the lumbar region. Besides this upward course of the sinus, we note a side branch running posterior toward the sacrum, entering same and partially filling a cavity about one inch in diameter. Evidently this cavity is the original focus of the disease from which all the other sinuses resulted.

This radiograph demonstrates the possibility of mistaking a sacral tuberculosis for a hip-joint disease. The stereoscopic radiograph makes such a mistake almost impossible.

FIG. 10. *Empyema and lung abscess.* In connection with the study of pulmonary tuberculosis with the stereoradiograph, I have also undertaken the study of empyema and lung abscess. When an empyema has been drained and a cavity remains, it is possible to estimate its size and contour by means of the bismuth paste. This has been illustrated in my own publications, as well as by other surgeons. By using stereoscopic plates for this purpose, we can do more than estimating the size and contour — we can also determine the exact location of the cavity. From our collection of empyema pictures I desire to show one illustrating the above. Fig. 10 represents a pleural empyema, which had its drain at the lowest point. In the plastic picture of the chest we can see that the cavity does not occupy as much space as one would suppose from the large surface covered by the injected paste. The empyema occupies a flattened space which involves only the posterior part of the pleura and in front of this is perfectly healthy lung tissue. A lateral view of this picture would show a narrow but well-defined shadow along the posterior border of the lung. The question might be asked: As long as we have to make two exposures for a stereoscopic radiograph, why not take an anteroposterior and a lateral view of a single plate? This question can be best answered by allowing the inquirer to view a few stereoscopic radiographs, because the advantages are too manifold and best shown by actual demonstration.

ANATOMICAL STUDIES

In our experimental work I have found the stereoradiograph of great assistance in anatomical studies, especially in tracing blood supply in the various organs or studying the distribution of the bronchi, as well as in the study of the topography of various organs. Most of these studies were carried out by means of injecting the organs or vessels with liquefied bismuth paste or mercury before taking the radiographs. I desire to show a few examples from our collection.

FIG. 11. *A. Pseudencephalus stomach and intestines injected with bismuth paste.* This figure illustrates the actual location and position of the stomach of a child at birth. A few hours after stillbirth a catheter was passed into the stomach and the liquefied paste was injected. The radiograph taken demonstrated several most instructive facts:

1. That at birth the child's stomach is vertical; it is located in the left side of the abdomen.

2. That it is possible to demonstrate by the radiographs whether the child has taken a breath after it was born. In this case the lungs are entirely collapsed; not a sign of air present in them.

3. There is no air or gas in the intestines.

4. The frontal as well as the parietal bones are absent.

5. The development of the osseous system at full term may be studied from the radiograph.

I have in my collection a number of specimens in which I traced the blood supply at birth in fœtal life as well as the normal blood supply of various organs in the fullgrown body, including the eyeball, but the study is not yet completed, and thus the publication will be reserved for future time.

FIG. 12. *B. Anatomical study of the human skull.* An instructive anatomical study by means of the stereoradiograph is that of the human skull. In Fig. 12 I show the anteroposterior radiograph of a perfect skull, which is the first anatomical stereo experiment I have undertaken. The subject has recently been taken up by my brother, Dr. Joseph Beck, who has made comparative studies in the sinuses of the head of the lower animals, a work which promises to be quite instructive. The human skull presents so many points for study that by means of this stereoscopic

view we obtain a splendid opportunity to study them. The size and location of all the accessory sinuses is plainly visible, and the density and thickness of certain bones can easily be estimated. Every groove, every depression, the cells in the mastoid and in the ethmoid, can be measured and studied. This must certainly interest the oto-rhinologist.

FIG. 13. *C. Outlining of the contour of the skin.* Recently I have made an addition to our stereoscopic work which will prove of practical value, namely, to produce an outline of the skin by rubbing into the skin the powder of bismuth subnitrate. This powder will fill out the fine crevices and pores in the skin and the stereoscopic view will produce a fine veil, showing every furrow, any deformity, swelling, etc., which in an ordinary radiograph are lost. I show in Fig. 13 the hand of a workingman, in which all the fine furrows and cross-lines can be plainly seen — "a sort of an imitation Bertillon system of finger marks." One can plainly see the distance between the bones and the skin surface and thus can estimate the distance of foreign bodies, such as needles, from the skin surface.

FIG. 14. *D. Blood supply of foot studied by injected arteries with bismuth paste.* This stereoradiograph speaks for itself. It represents one of many parts of the human anatomy which I have injected and studied in this way. It was very difficult for me to choose which one of my collection I should include in this article, each seemed to me the most instructive. It seemed like a sin to omit showing the knee-joint with its tortuous rete articularis, surrounding the joint, showing the fine distribution of the blood-vessels to its finest subdivisions. The elbow of an amputated arm in which both veins and arteries were injected with mixtures of the paste of various strengths shows most lucidly the relation of the two sets of vessels, but had to be barred from the list of illustrations on account of lack of space.

The technique in producing perfect results in these anatomical studies requires considerable experience, and many failures must precede the attainment of perfect results.

In the reductions from the original large plates to the ordinary stereocard size, at least 100 per cent of the detail is lost, and in printing another 100 per cent, so that one must study the finer points on the large plate. In these we can trace the finest blood-vessels to their anastomosis with their mates; we can trace the nutrient arteries into the center of the bones, even to the divisions, to microscopic size.

This picture also illustrates that the bismuth paste, when properly applied, will not clog any sinuses, but will enter into all and the smallest recesses.

LOCATION OF FOREIGN BODIES

In this particular field the stereoscopic radiograph is of utmost utility. A large number of instances might be cited in which the single plate left us in doubt, whereas the stereoscopic picture gave us the exact location of the foreign body.

In a case of lung abscess, the cause of which was a small pintack within the lung, I was able to definitely locate the foreign body by means of a stereoradiograph, and could tell in advance that the tack, which was the size of a lentil, was one inch internal and just behind the tenth rib. The operation was thus simplified and the correctness of the anatomical diagnosis verified when I found the pin in the predicted location. (Case reported in the Journal of the American Medical Association, December 18, 1909.)

A convincing illustration of the ease with which foreign bodies are located is given in Fig. 15, which shows the traces of a bullet and a buckshot in one hand.

FIG. 15. A lady, forty years old, dealer in firearms, sold a revolver to a man. He returned shortly, complaining that the revolver would not work. The lady, in trying to demonstrate that it worked perfectly, discharged the revolver. The bullet passed through and shattered her ring finger and entered the hip of the buyer. The man was taken to the Cook County Hospital, where the bullet was extracted. The lady was brought to us for treatment for the injury to her hand. A single radiograph disclosed a most mysterious finding. A shadow of a

bullet showed plainly in the shattered portion of her finger, although we had a reliable report that the bullet was extracted from the man's hip, and the lady was certain that only one shot had been fired. Besides this bullet, a buckshot was plainly visible near the metacarpal joint of her little finger. The presence of the buckshot was accounted for by the patient's history of having been shot eighteen years previously in the same hand. The unmistakable picture of a bullet in her finger justified an operation, which explained the mysterious multiplicity of bullets. We found a sliver, as thin as tin foil, which had been sliced off from the bullet as it passed through the sharp fractured ends of the bone. It happened to be lodged with its broad and flat surface horizontal to the X-ray plate, so that it gave a shadow so similar to the shape of the bullet that one could not take it for anything else. Here is a case in which a stereoscopic picture would have cleared the mystery before operation.

Stereoscopic radiograph (Fig. 15) taken five years after operation shows the fracture, completely healed, but also the evidences of a gunshot. Five little specks of lead are within the area of the first phalanx of the ring finger. Three of these specks (the upper set) are on the dorsal surface of the bones, while the two lower specks are on the ventral surface. The stereoscopic effect is quite plain.

We note also that the buckshot is on the dorsal surface of the hand, a fact which can be corroborated clinically, since that shot can be felt directly beneath the skin.

After one has employed this stereoscopic method of radiography he is no longer satisfied with the single plates, and not only appreciates its great advantages, but realizes under what disadvantages he was obliged to work when using only single radiographs. One obtains an entirely new conception of this science and recalls the numerous errors of the past which resulted from false interpretations of single radiographs.

My strong advocacy for stereoscopic work for surgeons is not due to overenthusiasm or lack of appreciation of the fact that a method in order to be popular, must be simple and not too costly; my aim is an earnest appeal to the leaders in radiography to employ a method which will make their work doubly valuable, one which will enable the clinician himself to interpret the radiograph and thus bring this diagnostic agent into more general use.

One cannot be too emphatic, however, in stating that the radiogram, no matter how perfect it may be, can be regarded only as a diagnostic aid to the other methods of examination, and not as their substitute. He who will diagnosticate with the X-ray alone will make many blunders and soon learn that he must employ at the same time the other well-tested methods of examination and then use the radiogram to confirm his diagnosis.

CANCER OF THE UTERUS AND ITS CURE BY THE RADICAL ABDOMINAL OPERATION [1]

By REUBEN PETERSON, M. D., Ann Arbor, Michigan
Professor of Obstetrics and Gynecology, University of Michigan

WHAT is the present status of the radical abdominal operation for cancer of the uterus? Since Emil Ries in 1895, as a result of his operations on dogs and cadavers convinced himself that the uterus, parametria, and pelvic glands could be removed by the abdominal route without killing the patient, the advisability of this operation has been the subject of much discussion. Yet, after fifteen years of trial and controversy the operation cannot be said to be popular in this country. This seems strange, for it is a distinctly logical procedure, being based on the fundamental principle that starting as a local process, cancer soon advances along routes determined by the particular location of the disease and that in order to insure a non-return of the process, not only the growth itself but its extensions must be removed radically.

Failure to act up to these principles has been the cause of non-success in the surgical treatment of cancer elsewhere in the body. The older generation of surgeons never had seen a case of cancer of the breast cured by operation for the reason that the axillary glands were never removed. Halsted's extensive excision not only of the breast and the pectoral muscles but all of the glandular elements which could be removed marked a new era in the surgical treatment of carcinoma of the breast. Now one confidently expects to cure breast cancer if it can be seen early. And this has been the history of cancer in other parts of the body.

Vaginal hysterectomy and also abdominal hysterectomy as advocated by Freund for uterine cancer had proved failures for the reason that they failed to remove all the cancerous tissue at one or both sides of the uterus. As Ries pointed out, in 1895 it was the common opinion that in cancer of the uterus there was no involvement of the lymphatic glands until late in the disease. If the uterus was fairly movable and the broad ligaments not indurated the case was considered operable and the diseased uterus removed in such a way as to leave cancerous tissue behind in the large majority of cases. Many of us remember the old vaginal hysterectomy days. There was a comparatively low primary mortality. Patients left the hospital free from pain and foul odor. They and their friends were well pleased. Then came the aftermath; the return of the disease usually in the scar, then the slow lingering death with all its accompanying horrors. Surgeons whose word could be relied upon, and who were honest enough to report their cases, frankly confessed that not over five per cent of their patients lived more than a few years. Once in a while a patient survived, but she was the exception.

Thus surgeons the country over were ready to adopt a new procedure, if thereby the ultimate results could be improved. But the high mortality of the new procedure, together with the fact that from lack of education along cancer lines patients sought relief late in the disease, has prevented the operation from becoming popular in this country.

Jacobson in a carefully prepared statistical paper read at the last meeting of the American Medical Association (1910) stated that he had sent 330 letters of inquiry regarding the radical abdominal operation for carcinoma of the uterus to the leading surgeons and gynecologists of this country. There were 140 replies in which 22 operators gave their experience with the radical operation, the total number of such operations being 298. These figures are to be compared with 2,467 radical operations reported in the literature by Continental surgeons.

Statistics do not show that cancer of the uterus is much less frequent in America than abroad. Mortality statistics from the United States Census Office for 1908 show that the

[1] Address delivered at the annual meeting of the Oregon State Medical Association held at Portland, Oregon, September 7, 1910.

total number of deaths from cancer returned for the registration area, 1908, was 33,465, an increase of nearly three thousand (2,951) over the number returned in 1907. "The death rate from cancer, however, increased from 73.1 (per 100,000 of population) for 1907 to 74.3 for 1908, the latter being the highest death rate from this disease since the beginning of the annual mortality reports." According to the international statistics from the annual report of the Registrar-General of England and Wales, there are nine countries where the death rate from cancer per 100,000 population is higher than exists in the United States, while it is lower in nineteen countries. Thus, while there undoubtedly is more uterine cancer in such countries as England, Germany, and Austria, there is not enough more to account for the disproportion of radical abdominal operations in these countries as compared with the United States. Nor are there anywhere bolder or more skilful surgeons than exist in America. The explanation rather lies in the fact that the primary mortality of the radical abdominal operation is high in proportion, first, as the operator is inexperienced with this particular method, perhaps the most difficult in the whole realm of surgery, and second, as the cases come to operation late in the course of the disease. Both these factors obtain in this country. With very few exceptions surgical work is not concentrated here as it is in the older countries. Every one operates, and whatever may be said of ordinary surgery the radical abdominal operation for carcinoma of the uterus does not give a good primary mortality in the hands of the occasional operator or one who is not accustomed to a great deal of pelvic and abdominal work. Perhaps Wertheim's statistics show as well as any the improvement in the primary mortality due to increased experience:

Primary results of first 30 cases, 12 deaths, equal 40 per cent.

Primary results of second 30 cases, 5 deaths, equal 16.6 per cent.

Primary results of third 30 cases, 3 deaths, equal 10 per cent.

Primary results of fourth 30 cases, 4 deaths, equal 13.3 per cent.

The primary mortality in Wertheim's last 200 cases is about 10 per cent. However it must not be forgotten that the improvement in the primary mortality may depend not alone upon experience but upon the fact that the operator has ceased to perform as radical operations as he did at the beginning of his series. The second reason for a high primary mortality is the attempting to extend the indications for the operation, that is, operating upon cases too far advanced for any radical procedure. Unfortunately, in this country no broad educational campaign has been inaugurated in cancer of the uterus as has been done with certain contagious diseases, notably tuberculosis and diphtheria. Certain attempts have been made but they have lacked organized effort and amounted to little. Apparently the profession has been afraid of throwing the public into a panic about this much dreaded disease, the cause of which is still wrapped in mystery. Yet in Germany largely through the efforts of Winter the public has been properly educated until the early diagnosis of uterine cancer is the rule in a large proportion of cases.

This part of our subject will be considered at more length later on.

NATURE OF THE RADICAL ABDOMINAL OPERATION FOR CARCINOMA OF THE UTERUS

Up to the advent of this operation, the stumbling block to a wider eradication of the cancerous uterus had lain in the anatomical position of the ureters, which were situated so near the uterus as to prevent a free removal of the tissue at either side of this organ, for fear of injury to these important ducts. The radical operation proposed to overcome this difficulty by approaching the cancerous uterus from above. By tying the uterine artery outside of the ureter, the latter could be dissected free from its bed, thus permitting the removal of the parametrial tissue up to the pelvic walls. In addition, since it was known that the pelvic glands were affected in a certain proportion of cases of cancer of the uterus, the pelvic lymphatics were to be removed as thoroughly as was consistent with the preservation of the life of the patient. The third essential feature of the operation

was to remove with the uterus a considerable portion of the upper part of the vaginal wall. This step in the procedure was nothing new, since it had been an essential feature of the vaginal hysterectomy for cancer.

On paper it would appear as if the technique of the abdominal operation ought not to be very difficult. In reality, however, certain features of the operation make its performance exceedingly difficult, so that under the best of circumstances the primary mortality will always be high and accidents far from infrequent. The work has to be performed deep down in the pelvis. Certain steps of the operation cannot be hurried for fear of injury to important organs. While the time of the operation is shortened through experience, it must always be a long operation on account of the work which must be done. Patients with cancer are not usually in very good physical condition, since from the nature of this disease they are prone to exhausting hæmorrhages and septic absorption. Hence they do not stand prolonged operations well. Again, the majority of cancer patients are over forty, or at an age when degenerative changes in the kidneys and circulatory apparatus are only too common. At this time of life an ordinary operation is borne fairly well; not so a prolonged operation like the one under discussion with its accompanying shock.

My own experience dates back to July 15, 1902, when my first radical abdominal operation for carcinoma of the cervix was performed. Death resulted from shock, for the patient was a large, exceedingly fleshy woman. The disease was well advanced, necessitating in hands inexperienced with this particular method, a prolonged operation. Most of the material I have had to work with could be classed as advanced. They were cases such as formerly I had subjected to vaginal hysterectomy usually with rapid recurrence, or else had treated with caustics or the cautery. I felt from the first that the primary mortality of the abdominal operation must be high in such cases, but that if only a few patients could be permanently cured, it was a better record than my past one had been. Hence, I have persevered in spite of a primary mortality which would almost make one wish to give up surgery were it the accompaniment of other kinds of surgical work. In eight years I have only performed 40 radical abdominal operations for carcinoma of the uterus, a small number in comparison with Wertheim's four or five hundred. Yet, each of these women has meant a personal problem which had to be solved the best possible way. To subject her to the old method meant with very few exceptions a return of the disease and a lingering death; by the new method a chance and, as far as the operator was concerned, an ever increasing chance, that the disease might be eradicated and the patient permanently cured. Each patient has had the situation carefully explained to her and in each instance has elected the operation.

Winter has done much to place the statistical study of the operative treatment of carcinoma of the uterus upon a firm, scientific foundation. In order that there may be a common basis for the consideration of the different types of operation, he claims that each operation should be considered under the following headings:

1. Primary mortality.
2. Percentage of operability.
3. Permanent results after five years.
4. Percentage of absolute cures.

1. *Primary mortality.* Out of the 40 cases there were 10 primary deaths, or 25 per cent. I have no excuses to offer for this high mortality, except those already mentioned. The cases were almost without exception what may be designated as advanced; the operation was a new one in my hands with an exceedingly high mortality among the first few cases. There were six deaths in the first 14 cases or a mortality of 42.8 per cent. There were only four deaths in the next 26 cases or a mortality of 15.3 per cent.

Statistics are notoriously unreliable, but they are perhaps more trustworthy as regards this particular operation, since reporters are compelled to follow the statistical rules laid down by Winter, if they wish their results compared with others. Jacobson has collected and tabulated 2,765 advanced abdominal operations for cancer of the uterus. There was a primary mortality among these

patients of 19.45 per cent. Some operators have had very low primary mortalities, as for example, Wertheim, 10 per cent, Jacobs, 6.37 per cent, and Zweifel, 10.8 per cent.

It is an exceedingly difficult matter to compare primary mortality statistics, for the reason that many factors entering into such statistics are either not explained at all or else in such an indefinite manner as to lessen their value. Obviously, an operator who selects only early cases will have a decidedly lower mortality, than he who extends the field of the operation and operates upon advanced cases in the hope that he will be able thereby to save a few of these patients, otherwise doomed to a miserable death. The primary mortality for early cases ought not to be much higher than for an ordinary panhysterectomy. Berkeley's statistics on this phase of the subject are interesting. From a private circular sent out to gynecologists of the United Kingdom he was able to collect 243 "Wertheim" operations, meaning by that term advanced radical abdominal operations for uterine cancer where Wertheim's clamping of the vagina preparatory to the removal of the uterus had been employed. From 238 of these cases he found the following primary mortality figures arranged according to the stage of the disease during which the operations were performed.

In 186 advanced cases, 23.1 per cent.

In 19 moderate cases, 5.2 per cent.

In 33 early cases, 6.3 per cent.

The fallacy of such figures lies in the indefiniteness of the terms "early," "moderate," and "advanced." What would be considered early or moderate by one operator would be judged advanced by another. As it is absolutely impossible to determine even approximately the time of the onset of the disease, so it is impracticable to arrange the cases according to the time the disease has existed. Hence all such figures have only a relative value. I also question the advisability of adding to the confusion by attempting to classify under the term "moderately early cases." With ulceration of one lip of the cervix, with a perfectly movable uterus, where the diagnosis has to be definitely determined by the microscope, a case would unreservedly be classed as "early." Beyond this stage when the broad ligaments are palpably affected it is best to consider the case "advanced." How advanced it is difficult to define. One case may be far advanced and almost hopeless from an operative standpoint because of the extensive glandular involvement high up, while apparently the parametria are very slightly affected. On the other hand, a case where the disease apparently has existed for some time, judging from the symptoms, where the broad ligaments are indurated, may at operation not prove to be so far advanced as supposed, that is, from an operative standpoint.

With this explanation in mind I may say that all of my first 14 cases with a primary mortality of 42.8 per cent were considered to be of the "advanced" type. In no one of them would it have been necessary to confirm the diagnosis before operation by the microscope, except three cases where the body of the uterus was the seat of the disease. In the last 26 cases there were four which were designated as "early" and 22 as "advanced." There was no primary mortality connected with the early cases. This leaves a primary mortality of 18.1 per cent in the 22 advanced cases. The primary mortality of the 36 advanced cases was 27.7 per cent.

As far as possible, cases of cancer of the cervix should be considered separately from those where the body of the uterus is the seat of the disease. This is because of the tendency of carcinoma of the body to limit itself for some time to the uterus. The broad ligaments and pelvic glands are involved in this type of the disease much later than is the case with cancer of the cervix. Hence one ought to see cases of cancer of the body earlier than where the cervix is the seat of the disease, and the primary mortality should be correspondingly lower.

Of the 40 cases, 33 were cancer of the cervix, while in seven the body of the uterus was affected. There were nine operative deaths in the 33 cervical cancer cases, or a primary mortality of 27.2 per cent. One death resulted from the seven operations for carcinoma of the fundus, or a primary mortality of 14.2 per cent. In the fatal case the

patient was suffering from chronic nephritis and possibly should not have been operated upon, since death resulted from uremia, the shock of the operation leading to complete suppression of the urine.

SUMMARY OF PRIMARY MORTALITY IN 40 CASES

Total number of cases	40
Total number of deaths	10
Total primary mortality	25 %
Primary mortality first 14 cases	42.8%
Primary mortality last 26 cases	15.3%
Primary mortality four early cases	0 %
Primary mortality 36 advanced cases	27.7%
Primary mortality 33 cervical cancers	27.2%
Primary mortality seven cases cancer fundus	14 %

2. Percentage of operability. Jacobson found great difficulty in collecting statistics upon the percentage of the cases of uterine cancer capable of being subjected to the radical abdominal operation among the total number of cancer cases seen by the operator in a given time. Very few operators, in this country at least, keep records accurate enough to be of much value in this regard. Perhaps I am wrong, but I doubt the value of statistics secured through the means of circular letters, where the data can only be obtained at the expense of considerable labor. At least, the statistics I returned upon the percentage of my cases of cancer of the uterus operable by the radical abdominal method were only approximately correct. As far as I could judge at the time my operability was about 20 per cent. A more careful study of my cancer cases, for the purposes of this paper, shows that the percentage of operability was considerably higher, namely, 31.7 per cent. The error arose from not including in my first estimate the percentage operability of the cancer cases treated in my private hospital, where the figures were much higher than in the university clinic. However, the general average may be approximately correct, since Jacobson found that the operability was nearly twice as great abroad as in this country (35 and 65.5 per cent). This undoubtedly is due to the effect of the campaign of education regarding cancer which has been waged abroad for some years. It is notorious that in this country patients with cancer either apply to or are referred to the surgeon late in the disease, often too late to hope for a radical cure. Still with an operation like the one under consideration many cases hitherto considered inoperable may be operated with success.

Wertheim saw his proportion of cancer cases suitable for the radical operation rise from 15 per cent under the old methods to 60 per cent under the new operation.

Winter insists that an exploratory laparotomy is necessary before it can be determined whether certain cases are suitable for the radical operation. Only after a careful intra-abdominal examination can it be determined whether hardened areas in close approximation to the cancerous uterus be due to inflammatory products or to an extension of the disease.

Judged from the material in our own clinics it hardly seems possible that Bumm and Mackenrodt are able to operate radically upon 90 and 92 per cent of their cancer patients, but we are forced to accept their statements, for both are reliable men. It must be that they see patients in earlier stages of the disease than the majority of operators, for if they operated upon hopeless cases their primary mortality would reveal the fact; yet the latter is not especially high, since in neither case is it above 20 per cent.

Other factors besides the actual extension of the disease must be taken into consideration in estimating the operability of certain cases. This will be considered at more length under another heading.

3. Permanent results. This after all is the most interesting part of the problem connected with the radical abdominal operation. Former operative procedures, like vaginal hysterectomy, gave a more favorable primary mortality, an advantage availing little when only the exceptional patient lived more than two years after the operation. The superiority of the radical abdominal procedure lies in the fact that, while the primary mortality from the nature of the operation must always be high, more patients are alive a certain definite number of years after this than after any other operation. By Winter's suggestion and by common consent a patient must remain free from the disease five years before a

cure can be said to have resulted from the operation. Exceptionally there will be a recurrence after the five year period, as for example Ries' case of recurrence in the inguinal glands nine years after the operation. But such cases are rare and with our present knowledge can practically be disregarded. However, all postoperative carcinoma of the uterus cases should be kept track of indefinitely after the operation even after the expiration of the five year period. Only thus can the actual percentage of recurrences after the five year period be accurately determined.

In order to determine the percentage of permanent cures, it is necessary to deduct from the total number of radical operations:

1. The number of primary deaths.
2. The number of patients lost sight of since operation.
3. The number of patients where it can be proved beyond dispute that death resulted from some intercurrent disease in no way connected with cancer.

Statistics compiled under these rigid conditions will be of permanent value. In this country there is far more difficulty in keeping track of postoperative cancer cases, than in foreign countries, where such labor is lessened by accurate police supervision. Still, I believe each patient can be kept in touch with, if enough care and attention be bestowed upon the ways and means of so doing. Every patient lost sight of must be deducted from the total number of operations. Unless it can be proved by personal observation or by the testimony of a physician of acknowledged ability that the patient died of some intercurrent disease, such patient must be counted among the number of recurrences.

From the nature of my material I have been able to keep in accurate touch with the thirty patients who survived the operations, thus being able to meet the above requirements in every particular. Since only 12 cases were operated upon five years or more ago, percentages count for little. Still, for the sake of comparison and for their relative value they are given. Out of the 12 cases there were five primary deaths or 41.6 per cent. There were recurrences in three out of the seven who survived the operations, the remaining four patients being alive, in good health and free from recurrences five years or more after the operations. The percentage of permanent cures after five years, then, is 57.1 per cent. If only the cases of carcinoma of the cervix be considered there will be two patients out of five recovering from the operation, or a percentage of permanent cures of 40.

SUMMARY OF PERMANENT RESULTS IN 12 CASES OPERATED MORE THAN FIVE YEARS AGO (1910)

Total number of cases	12
Number of primary deaths	5
Primary mortality	41.6%
Number surviving operation	7
Number of recurrences	3
Number free from recurrences and in good health five years or more after operation	4
Percentage of permanent cures	57.1
Percentage of permanent cures only counting carcinoma of cervix	40

(For the sake of completeness the following summary of the 23 patients now alive is added.)

SUMMARY OF 23 PATIENTS ALIVE AT THE PRESENT TIME AFTER RADICAL OPERATION FOR CARCINOMA OF THE UTERUS

	Cervix	Fundus
Alive and free from recurrence 5 years or more	2	2
Alive and free from recurrence 4 years	1	1
Alive and free from recurrence 3 years	3	1
Alive and free from recurrence 2 years	6	1
Alive and free from recurrence 1 year	4	
Alive but with recurrences 2 years	2	
	18	5

A number of the recurrences were undoubtedly due to errors in technique, such as failure to remove enough of the vaginal wall, and the prolongation of the operation to such an extent as to render impossible the removal of lymph glands. But in spite of many mistakes I am encouraged as never before in the operative treatment of cancer of the uterus. The next forty cases ought to show a decided improvement both in primary and permanent results, especially if through education patients apply earlier for treatment.

In this connection it may be interesting to note that even according to statistics prepared in the most rigid manner, certain operators are able to report the most gratifying results. Wertheim reported 138 women alive after five years, or a percentage cure of 62 per cent, after the radical abdominal operation. Polosson reports 60 per cent alive after five years, Mackenrodt, 45 per cent, Bumm, 30 per cent, and Veit and Zweifel each 27 per cent after the same operation.

Such figures are encouraging for an operation still in its developmental stage, especially when it is taken into consideration that the percentage of operability is increasing each year.

4. Percentage of absolute cures. This is an attempt to reduce to one figure the ratio between the number of cases of cancer seen by any one operator during a given period and the number of cases operated upon and free from recurrences after five years. Winter's method of obtaining this figure is much simpler and as far as can be seen, just as accurate as the percentage obtained by Walstein, which includes primary mortality as well.

Winter's formula is $\frac{O \times D}{100}$. Here O denotes the number of cases operated on out of 100 seeking relief, and D denotes the number of cases that remained healthy out of 100 operated upon. According to the table Wertheim published in 1905, his absolute percentage of cures, exclusive of carcinoma of the corpus uteri, was 20.4 per cent. Because of the increase of his operability percentage and the reduction of his primary mortality to 10 per cent or under, according to his report at the last International Medical Congress he expects his percentage of absolute cures after five years to be at least 30 per cent.

Döderlein's 1904 figures are interesting as showing the necessity of separating the carcinomas of the cervix from those of the body. His absolute cures after five years where this was not done were 19.6 per cent, this percentage being reduced to 10.4 when cervix carcinoma alone was considered.

I am aware that the number of my own cases is very small and for that reason one recovery or death would make a proportionally great change in the result. Still, I believe it best for an operator to give his results no matter how small his figures, so that the latter may be compared with his later reports. Again, I believe it better to report a small number of cases operated at least five years, than a much larger number of more recent cases where the chances of recurrences are very great.

There were 12 patients operated upon five years or more ago. Of these, 10 were cases of carcinoma of the cervix. There were five primary deaths. Three patients died of recurrences while four patients, two cases of carcinoma of cervix and two of carcinoma of the body, are alive and well to-day. Winter's formula gives the following:

Percentage of the absolute cures 12 cases operated upon five years or more ago:

Cervix and fundus cancers together	9.3
Cervix cases alone	5.4

It must be remembered that these figures represent a period when the primary mortality was very high, 41.6 per cent, as compared with 17.8 for the balance of the series. A high primary mortality means advanced cases with all the accompanying chances of recurrences, or imperfect technique with its attendant dangers of incomplete work. Hence it is not unreasonable to expect that the percentage of absolute cures will be markedly higher in the next five years.

THE PELVIC LYMPH GLANDS

For the past fifteen years the greater part of the discussion over the radical abdominal operation for uterine cancer has been centered upon what to do with the pelvic lymph glands. Every operator is pretty well agreed as to the advisability of as wide a removal of the parametria as possible. This should be done even where there is no macroscopic evidence of cancer, for the researches of many observers have proved beyond doubt that in a large proportion of cases of cancer of the cervix the parametrial tissue is also the seat of the disease. Among others Baisch, Kundrat, Wertheim, Laméris-Kermauer, Pankow, and Schauta have shown that the parametrium is affected in between 50 and 70 per cent of

the cases. And since one cannot say in a particular case before microscopic examination which parametrium is infected, it is obvious that in all cases it should be completely removed. In fact, this is essential to the radical abdominal operation. Otherwise one could be content to perform the old vaginal hysterectomy with its low primary mortality and equally low percentage of absolute cures.

If a case is operable at all by the radical abdominal operation, the parametrium can be widely removed, but the same cannot be said concerning the pelvic glands. Just how frequently the latter are involved in cancer of the uterus is rather difficult to say. Schauta found out of 50 patients dying from uterine cancer, the glands affected in 64 per cent, Riechelmann, in 86 cadavers, 35 per cent.

Berkeley states that examinations of 107 patients dying from cancer of the cervix at the Middlesex Hospital show that in 25.2 per cent the secondary deposits were entirely limited to the lumbar glands; in 42, or 30.3 per cent, both glands and viscera were involved. He concludes that in at least one-third of the patients who came for operation some of the pelvic glands are infected by cancer.

Wertheim found that in 10 per cent of the cases, notwithstanding the absence of cancer in the parametrium, the glands were cancerous, while in 27.5 per cent, although the parametrium was infected, the glands were free from cancer. In 40 per cent of the cases the parametrium and lymphatic glands were free from cancer and in 20 per cent both were infected. Opitz found the glands diseased in 33 per cent of operable cases, and Pankow in 38 per cent.

Ries claims, probably correctly, that the reason more glands are not found infected with cancer is due to faulty technique; that it often requires thousands of serial sections before cancer cells are discovered. His operations have been few in number, not more than 15, but in nearly all diligent search has shown cancer in one or more glands.

Of the 40 cases in my own series the glands were removed in 21. There were all subjected to microscopic examination although not in the rigid manner insisted upon by Ries. Glandular metastases were found in four of the 21 cases or in 19 per cent. Of these, one was a cancer of the fundus, death resulting a year later from a recurrence. Of the three cervix cases where the glands were found involved, two have died of recurrences, one six months and the other two years after the operation. The remaining patient is alive although the operation was performed two years ago. No carcinoma was found in two of the four patients who have survived the operation five years or more. In the other two no glands were removed.

Ries, Döderlein, Wertheim, Mackenrodt, and Bumm report cases where patients from whom carcinomatous glands were removed have lived from two to five years or more. As a rule, however, where the microscope shows the glands to be involved the prognosis is considered unfavorable, if not hopeless.

What then should be the policy of the surgeon regarding the pelvic glands in carcinoma of the uterus? Logically and theoretically Ries is right in his contention that the pelvic lymphatics should be removed in every instance. In a certain proportion of the cases it is certain that the glands are the seat of metastases, and since it is impossible to determine without the aid of the microscope, that is, by palpation, which cases are thus infected, it stands to reason that the lymphatics should be removed whenever this is possible without too great danger to the life of the patient. In the face of Wertheim's statistics with his 60 per cent of permanent cures, where glands are removed when such removal is not fraught with too many dangers, it seems to me it is clearly the surgeon's duty to look upon this question conservatively. The surgeon's task is to save as many lives as possible, not to operate in accordance with any preconceived idea which he is in duty bound to carry out no matter what may happen to the patient. What has been gained if the pelvis is cleanly dissected and the patient dies at the completion of the operation? If the only hope for each patient lay in glandular removal, the question would be different. But this is not true, as statistics plainly demonstrate.

A failure to remove the pelvic lymphatics is not a return to the old Freund operation. The parametria are still widely dissected in addition to the removal of a considerable portion of the vagina. A careful study of the whole question leads to the conviction that after all these latter procedures are the essential features of the radical abdominal operation, not the removal of the pelvic glands. If the latter can be done with a fair degree of safety to the patient, by all means let it be added to the technique, among other reasons, for the sake of increasing our knowledge of this most interesting question.

SELECTION OF PATIENTS FOR THE RADICAL ABDOMINAL OPERATION

The more one employs this operation for cancer of the uterus, the greater will be the number of cases in which it will be found suitable. It is almost impossible to determine the extension of the cancerous process through bimanual examination, except in markedly advanced cases. As far as physical examination goes, an exploratory laparotomy will be found more and more necessary to determine which cases shall be radically operated upon. Certain patients should not be subjected to the operation even though the extent of the disease seems to warrant the radical procedure. Fleshy patients with excessively fat abdominal walls must be carefully scrutinized before being advised to undergo the radical operation. Such patients' hearts, on account of fatty changes, are often illy adapted to withstand the shock of an operation necessarily of long duration on account of the technical difficulties induced by enormous deposits of fat in the pelvis. The Trendelenburg position, so essential to a proper packing back of the intestines and a clear view of the pelvic contents and the field of work, is a distinct menace to extremely fleshy patients on account of the weight such a position obliges the diaphragm to sustain. Then follows interference with respiration, added work for an already handicapped heart, and finally shock so profound that the patient often never recovers consciousness. Bovée's researches on the Trendelenburg position presented at the 1910 meeting of the American Gynecological Society show that the position has a marked effect upon the function of the kidneys, almost always diminishing the amount of urine secreted and oftentimes producing anuria. If to this be added the injurious action of the anæsthetic and the deleterious effect upon the kidneys of necessarily lengthy manipulation of the ureters, it at once becomes apparent why fat patients, especially if they give evidence of degenerative changes in the kidneys or the circulatory system, should not be subjected to the formidable operation under consideration. Excessive fat, a weak heart, and degenerative changes, then contraindicate the procedure no matter what may be the extent of the disease.

A continuous high blood pressure even in patients of a more slender build should lead us to investigate the case most carefully before advising an operation which under the best of conditions must be attended by considerable shock. In case the operation be decided upon where the general condition is far from promising, it is essential that the operation be performed in the shortest time compatible with the work at hand, and that the amount of anæsthetic administered should be reduced to a minimum. The exaggerated Trendelenburg position, because of its attendant dangers, has been dispensed with for a number of years in my clinic. After packing back the intestines and exposing the operative field, the table is brought again to almost a horizontal position or as near to this as is consistent with the operation to be performed. It has seemed to me and others connected with the clinic that shock has been much less frequent and profound since the introduction of this modification.

The radical abdominal operation is contraindicated in the case of very anemic or septic patients. These two conditions are only too common in patients with carcinoma of the uterus. They are not fitted to undergo such a severe operation as the radical abdominal. Preliminary cauterization and curettage will stop the hæmorrhage and septic discharge and enable the patient to get into much better condition before the major operation.

Failure to recognize this necessity will result in many primary deaths.

CAUSES OF DEATH AFTER THE RADICAL ABDOMINAL OPERATION FOR CANCER OF THE UTERUS

Shock, I believe, is the most common cause of death, for reasons which have just been enumerated. Jacobson, however, found that in 80 cases where the cause of death was mentioned, in 31 death was said to be due to infection or sepsis, 19 to peritonitis, while in only 18 was death thought attributable to shock. Berkeley's five deaths in 30 cases were all due to shock. The causes of death in the 10 deaths in my series were as follows:

Shock	4
Peritonitis	2
Hæmorrhage	2
Embolism	1
Uremia	1
	10

I believe it to be much easier to guard against peritonitis than against shock. To be sure usually the operator has to deal with a diseased, septic uterus with all of the dangers attendant upon removing such an organ from above. Still, through preparatory curettage, cauterization, and liberal use of strong bichloride or formalin solution in the vagina prior to the abdominal section, the chances of contamination are greatly reduced, especially if we add the clamping of the vagina before its amputation, and thorough drainage of the raw surfaces through the vagina. The drainage of the pelvis I do not consider usually necessary, being content with the closure of the peritoneal cavity and with drainage of the subperitoneal spaces. Bumm has reduced his mortality from sepsis by thorough drainage from 38 to 5 per cent.

Hæmorrhage will sometimes be the cause of death, veins deep down in the pelvis being prone to vicious bleeding. This is best avoided by clamping the veins at either side of the ureter before splitting through its sheath. The hæmorrhage is usually controlled but sometimes not before so much blood has been lost as to turn the scale unfavorably in a patient quite shocked before the advent of the hæmorrhage. Pneumonia, embolism, and uremia may cause death after this as after other abdominal operations, and for that reason need not be considered here.

INJURIES TO URETERS

It is inevitable that in a certain proportion of cases, the radical abdominal operation should result in the impairment of the ureter, with resulting ureteral fistula. Out of 400 cases of the advanced abdominal operation for uterine cancer, Weibel reports ureteral fistulæ in 24, or in six per cent. In my own series of 40 cases, three ureteral fistulæ resulted, or in seven per cent of the cases. In two cases the fistulæ developed several days after the operation, showing that they resulted from necrosis through interference with the ureteral blood supply. This is the usual cause of such injuries, for the ureter being in plain sight, it is rarely accidently cut during the operation. As Sampson's researches have so beautifully shown, the ureter has a blood supply of its own and can be lifted from its bed near the uterus without necrosis resulting, if not disturbed higher up. With sharp pointed scissors its sheath can be cut through after the veins on either side have been clamped. It can be lifted from its bed near the uterus or pushed downward gently with gauze in such a manner as not to injure it. However, in a certain proportion of cases necrosis will result. Some of these fistulæ will heal spontaneously, as happened in one of my cases. If healing does not occur, ureterovesical implantation can be performed later, or in case of a pyelonephritis resulting, nephrectomy can be done. The third ureteral fistula occurred in a case in reality too far advanced for the radical operation. The ureter was embedded in a mass of cancerous tissue, necessitating excision and vesical implantation, a fistula subsequently resulting. The patient died a short time afterward from a recurrence.

INJURY TO THE BLADDER

One vesicovaginal fistula resulted. In this instance the bladder wall was affected by an extension of the growth, necessitating a

resection of a portion of the bladder. The sutures failed to hold, a vesicovaginal fistula being established some days after the operation. Even where a bladder fistula does not result, the bladder shows the effect of its extensive manipulation during the operation. Cystitis is quite frequent after the radical abdominal operation and oftentimes requires treatment. Vesical paresis is the rule, requiring frequent catheterizations, which add to the chances of cystitis.

THE FUTURE OF THE ABDOMINAL OPERATION FOR CARCINOMA OF THE UTERUS

I have purposely refrained from mentioning the radical abdominal operation's greatest rival, the advanced vaginal hysterectomy for carcinoma of the uterus, as advocated by Schauta. In spite of the latter's excellent primary and ultimate results, in my opinion this operative method will never be universally adopted. Even with the extensive lateral Schuchart incision, it can never hope to allow of the removal of the pelvic lymph glands, and for all we know now the hopes of the future may be based upon their extensive removal. Personally, I have had no experience with the operation, for it has never appealed to me, in spite of considerable experience with operations by the vaginal route.

Our future work is certainly laid out for us if we are to equal the splendid records of other operators. We need a better educated public along cancer lines. Certainly this is not an impossible task. Let us lay aside our hesitancy, our fear of being unethical, and tell the women the symptoms of this disease in such a way that they will seek relief early, when operative treatment holds out the most hope of cure.

The operation we have been discussing has not had the last word said about it. There are many problems connected with it still to be worked out. The question of glandular metastases is a problem by itself, only to be solved by many careful microscopic examinations and as careful clinical notes on the cases from which they were removed. The same may be said of other mooted questions in connection with this most interesting subject. And since the only hope for the poor woman with this terrible disease lies in surgery, let the surgeon with a full appreciation of his responsibilities, with patience and perseverance keep eternally working until that golden day has dawned, when the real cause of cancer being discovered, he may lay aside his scalpel, and with a glad heart turn such patients over to his internal medicine confrères.

REFERENCES

BAISCH, K. Der Wert der Drüsenausräumung bei der Operation des Uteruskarzinoms. Arch. f. Gynæk., 1905, lxxv, 273–299.

BERKELEY, C. Wertheim's panhysterectomy for carcinoma of the cervix. J. Obst. & Gynec. Brit. Emp., 1909, xv, 145–168.

BOVÉE, J. W. Tr. Am. Gynec. Soc., 1910.

BUMM, E. Klinische Erfahrungen über Beckenausräumung bei Uteruskarzinom. Charité-Ann., 1907, xxxi, 428–438.

DÖDERLEIN. Döederlein and Kroenig—Operative Gynækologie, 1907, 518–521.

FREUND, H. W. Zur erweiterten Freund'schen Operation bei Krebs der Gebärmutter. Ztschr. f. Geburtsh. u. Gynæk., 1901, xlvi, 206–231.

HALSTED, W. S. The results of operations for the cure of cancer of the breast performed at Johns Hopkins Hospital from June, 1889, to January, 1894. Ann. Surg., 1894, xx, 496–555.

JACOBS. Chirurgische Behandlung des Uteruskarzinoms. Monatschr. f. Geburtsh. u. Gynæk., 1905, xxii, 318.

JACOBSON, J. H. The results obtained from the radical abdominal operation for cancer of the uterus. J. Am. Med. Assn., 1910–1911.

KUNDRAT, R. Ueber die Ausbreitung des Karzinoms im parametranen Gewebe bei Krebs des Kollum uteri. Arch. f. Gynæk., 1903, lxix, 355–409.

KERMAUER, F. AND LAMERIS, H. Zur Frage der erweiterten Radicaloperation des Gebärmutterkrebses. Beitr. z. Geburtsh. u. Gynæk., 1901, v, 87–136.

MACKENRODT, A. Die Radicaloperation des Gebärmutterscheidenkrebses mit Ausräumung des Beckens. Verhandl. d. deutschen Gesellsch. f. Gynæk., 1901, ix, 139–146.

OPITZ. Der Stand der Bekämpfung des Gebärmutterkrebses. Monatschr. f. Geburtsh. u. Gynæk., 1906, xxiii, 62–78.

PANKOW. Cited by Koblanck in Veit's Handb. f. Gynæk., 1908, iii, pt. ii.

POLOSSON, A. Hystérectomie abdominale avec évidement pelvien et recherche des ganglions pour cancer de l'utérus. Reflexions sur 32 opérations. Rev. de gynéc., 1905, ix, 771–816.

RIECHELMANN. Cited by Berkeley, J. Obst. & Gynec. Brit. Emp., 1909, xv, 149–168.

RIES, E. Eine neue Operationsmethode der Uteruskarzinom. Ztschr. f. Geburtsh. u. Gynæk., 1895, xxxii, 266.

SAMPSON, J. A. Complications arising from freeing the ureters in the more radical abdominal operations for carcinoma cervicis uteri, with special reference to postoperative ureteral necrosis. Bull. Johns Hopkins Hosp., 1904–5, xv-xvi, 123–134.

SCHAUTA, F. Die erweiterte vaginale Totalextirpation des Uterus bei Kollumkarzinom. Wien., 1908.
VEIT, J. Handb. d. Gynæk., 1908, iii, pt. 2.
WALDSTEIN, E. Zur Berechnung des "absoluten Heilungsprozentes" in der Karzinomstatistik. Centralbl. f. Gynaek., 1904, xxviii, 1286–1291.
WERTHEIM, E. Beitrag zur Frage der Radikaloperation beim Uteruskrebs. Wien. klin. Wchnschr., 1900, xiii, 1101–1105. Also: Arch. f. Gynæk., 1900, lxi, 627–668.
Carcinoma uteri. Jahrb. d. Wien. K. K. Krankenanstalt, 1898, Wien. and Leipzig, 1900, vii, pt. 2, 342.
Kurzer Bericht über eine 3. Serie von 30 Uteruskrebsoperationen. Centralbl. f. Gynæk., 1902, xxvi, 1204–1206.
Die chirurgische Behandlung des Uteruskarzinoms. Monatschr. f. Geburtsh. u. Gynæk., 1902, xvi, 567.
Bericht über die von der erweiterten Uteruskrebsoperation zu erwartenden Dauererfolge. Wien. klin. Wchnschr., 1904, xvii, 783–785.
Die chirurgische Behandlung des Uteruskarzinoms. Cong. period. internat. de gynec. et d'obst. C.-R., 1902, Florence, Rome, iv. 497–506.
A discussion on the diagnosis and treatment of cancer of the uterus. Brit. M. J., 1905, ii, 680–695.
Ueberblick über die Leistungen der erweiterten abdominalen Operation beim Gebärmutterkrebs. Wien. klin. Wchnschr., 1906, xix, 787–788.
Carcinom der Gebärmutter. Verhandl. d. deutschen Gesellsch. f. Gynæk., Kong. 11, 1905, Kiel, Leipzig, 1906, 469–476.
Die Leistungen der erweiterten abdominellen Uteruskrebsoperationen. Centralbl. f. Gynæk., 1908, xxxii, 175–178.
Bericht über die Erfolge der erweiterten abdominalen Uteruskrebsoperation. Verhandl. d. deutschen Gesellsch. f. Gynæk., 1907, xii, 722–723.
Internat. med. Congress, Buda Pest, 1909. Centralbl. f. Gynæk., 1909, No. 10.
WINTER, G. Vorschläge zur Einigung über eine brauchbare Karzinomstatistik. Centralbl. f. Gynæk., 1908, xxxi, 169–175.
Ueber die Principien der Karzinomstatistik. Centralbl. f. Gynæk., 1902, xxvi, 81–87; 545–547.
ZWEIFEL. Diskussion zur Karzinomtherapie. Verhandl. d. deutschen Gesellsch. f. Gynæk., 1906, xi, 495–500.

KIDNEY DISPLACEMENTS AND DYSTOCIA[1]

KIDNEY DISPLACEMENTS, CONGENITAL AND ACQUIRED, AS ETIOLOGICAL FACTORS IN DYSTOCIA. REPORT OF A CASE DUE TO MOVABLE KIDNEY

BY PRENTISS WILLSON, M. D.
Assistant to Professor of Obstetrics, Georgetown University; Assistant Obstetrician, Georgetown University Hospital, Washington, D. C.

THE kidney may be found in the true pelvis in two conditions. It may be congenitally located there, or it may be sufficiently movable in extreme cases of floating kidney, using the term in its clinical and not in its strict anatomic sense, to find its way into the cul-de-sac. In either event the chance of a serious dystocia developing, should labor ensue, is of course obvious. A careful search of the literature has impressed me with the great rarity of dystocia from this cause, as I have been able to find only 10 cases in which labor was associated with congenital pelvic kidney, and only 2 cases in which the presence in the true pelvis of a very movable kidney caused dystocia. To these last I wish to add a case of my own.

Chapuis (1) in 1895, in a thesis entitled "De l'ectopie congénitale intrapelvienne du rein en Anatomie, en Gynécologie et en Obstetrique," in which he considered the subject in all its aspects, anatomical, embryological, gynecological, and obstetrical, collected 32 cases from the literature. Of these the left kidney was congenitally in the pelvis in 21 cases, the right kidney in 8 cases, and both kidneys in 3 cases. Those particularly interested in the subject are referred to this paper. Following are brief summaries of 10 cases in which labors were associated with congenital pelvic kidney:

1. Case reported by Hohl (2). In the two deliveries which this woman had had there was felt both times in the left side of the pelvis a tumor in which each contraction of the uterus caused pain. The passage of the head was retarded by it. Both deliveries terminated successfully. The woman died at 75 years of age, and an autopsy proved the tumor to be the left kidney.

2. Case reported by Heuter (3). In this case a tumor felt on the upper part of the sacrum led to the induction of labor at the 33d week. The child died. In a second pregnancy labor was again induced. The patient died shortly afterward of pulmonary edema, and the autopsy showed the

[1] Read before the Medical Society of the District of Columbia, November 16, 1910.

tumor to be the left kidney congenitally located in the pelvis.

3. Case reported by Fischel (4). The patient had had three confinements, all difficult. In the first the presentation was transverse and the child was stillborn. The second delivery resulted in a living child, the presentation being cephalic. In the third delivery the presentation was transverse and the labor difficult. The fate of the child is not mentioned. In this labor a tumor in the posterior part of the pelvis to the left of the promontory was noted. In the fourth pregnancy labor was successfully induced at the 35th week. The tumor was the left kidney congenitally placed in the pelvis.

4. Case reported by Mundé (5). The patient was a married woman 21 years of age, the mother of 2 children, the younger 14 months old. Bi-manual examination disclosed a normal uterus. In the pelvic cavity to the left of the uterus and extending to the bottom of the cul-de-sac there was felt an irregular ovoid tumor, very sensitive, of about the size of a flattened orange. It was slightly movable in every direction. The mass was thought to be the left tube and ovary and operation advised and accepted. At operation the tumor was found to lie on the floor of the pelvis. It was enucleated and brought into the wound with considerable hæmorrhage, when the operator was astounded to find he had the left kidney. Enucleation being complete the organ was removed, after making sure of the presence of a normal right kidney. Recovery was complete.

In this case the author seems to be in some doubt as to whether the kidney was in the pelvis as the result of a congenital condition or of nephroptosis. The case is accepted by Chapuis as a true illustration of congenital pelvic kidney, and, agreeing with him, I have therefore placed it here.

5. Case reported by Runge (6). This patient had had 7 children, all but the 5th being born alive and well without medical aid. In the case of the 5th there was a transverse presentation and death of the child. On examination the patient proved to be 3 months pregnant. The pelvis was of the flat, rachitic variety. On the right side there was an ovarian cyst; on the left, only palpable by vaginal examination, a tumor was noted which from its size and shape was thought to be the left kidney. A laparatomy was done at the 5th month and a dermoid cyst of the right ovary removed. Pregnancy was not interrupted and labor was induced at the 9th month. Podalic version, followed by a difficult extraction, resulted in the birth of a living child with a fractured right arm.

6. Case reported by Albers-Schönberg (7). The patient was pregnant for the 3d time. Both previous labors had been difficult and prolonged. The first labor lasted three days, and the child was born dead. The second labor was also long, but the child survived. The third labor had been in progress for 13 hours when a physician was called. The patient was in a state of collapse, which an examination under an anæsthetic showed to be due to a ruptured uterus. The child was extracted and the patient treated symptomatically, with death on the 5th day. Autopsy showed the left kidney fixed in the pelvis.

7. Case reported by Goullioud (8). This patient was operated on for a mass to the left of the uterus, thought to be an inflamed tube and ovary. The mass was found to be the left kidney congenitally displaced. The patient had a child 13 years of age. The history of the labor was that it was spontaneous and not unduly prolonged.

8. Case reported by Cragin (9). The patient was 25 years of age, and pregnant for the 3d time. Both previous labors were difficult and terminated, the first by forceps, the second by version. Behind the cervix there was found an elastic tumor reducing the internal conjugate to 7 cm. Operation was deemed expedient. At the operation the nature of the tumor was first discovered. The kidney was considerably distended. It was removed per vaginam — the only vaginal nephrectomy on record. Seventeen hours after the operation the patient went into labor and was easily delivered of a well formed baby which lived. The labor was easy and recovery perfect.

9. Case reported by Bland-Sutton (10). In a series of articles on the surgery of tumors, complicating pregnancy and labor, this authority mentions three cases of pelvic kidney in women and says: "In one of the instances it was associated with pregnancy and an unimpeded delivery."

10. Case reported by Dewis (11). In the course of a laparatomy the left kidney was found over the promontory of the sacrum, two-thirds in the cavity of the pelvis. It was retroperitoneal and permitted about 2 inches of motion. It was not disturbed. The patient had married at 19 and in 7 years had had 3 miscarriages and 2 deliveries at term. The character of the labors and the fate of the children is not mentioned.

A summary of the above cases shows 28 labors in 10 women with congenital pelvic kidney, the misplaced kidney being the left in every instance. There were 2 maternal and 5 fœtal deaths and 1 child born with a fractured arm. Twelve children were stated to have been born alive, and from the character of the context the greater number of the remainder were probably not stillborn. Transverse presentation was noted 3 times and rupture of the uterus once. Labor was induced prematurely 4 times, with 1 maternal and 1 fœtal death, and 1 child with a fractured arm. These figures would apparently justify the statement of Ribe-

mont-Dessaignes and Lepage (12), that most frequently a congenital pelvic kidney permits labor to proceed almost normally. However, the potentiality for harm of the condition in any given case can hardly be overestimated.

I now wish to call attention to the possibility of dystocia resulting from the prolapse of a floating kidney into the true pelvis in front of the child. An examination of many of the important American and European text-books on obstetrics shows that the possibility of such an occurrence is mentioned by very few. No author in the compass of my reading mentions any specific cases. In a careful search of the literature I have been able to find only 2 reported cases, and to these I shall add a case of my own.

The case reported in Swedish by Gratschoff (13) "A Case of Wandering Kidney as a Hindrance in Delivery," is as follows:

The patient was a II para, 29 years of age. She had had rickets. Menstruation began at 15 and was generally regular. At 23 she became pregnant and delivery was easy. The patient came under observation in labor. The thorax presented evidence of rickets. In the lower pelvis, low down in the cul-de-sac, a small, round, firm tumor, in shape resembling an ovarian cyst, was found. It moved easily on the slightest pressure. The pelvis was so blocked by it that a space of only about 4 cm. was left between it and the symphysis. Natural delivery was considered impossible, and the question of a crushing operation or Cæsarean section was decided in favor of the former. Tarnier's basiotribe was used. The head was delivered without difficulty, also the remainder of the body. Following the delivery the tumor suddenly disappeared from the pelvis and could be felt easily movable in the lower abdomen. Two weeks following delivery an oblong, firm tumor about 13 cm. in length easily movable, could be made out in the abdomen. Vaginal examintion showed the uterus movable and entirely separate from the tumor. The urine contained some albumen. The patient had some slight inconvenience from the kidney but refused operation and left the hospital.

The case recently reported by Bissel (14) is as follows:

The patient was 41 years of age and had been married 17 years. She had 2 children: the first born one year after marriage, weight 9 pounds, labor normal; the second born 3 years after marriage, weight 7 pounds, labor normal, phlegmasia alba dolens during the puerperium. Nothing abnormal was noted by the attending physician during the delivery of either of these children. In March, 1907, the patient was operated on for fistula in ano. At this time the operator diagnosed the tumor found to be in the pelvis as a fibroid on the posterior wall of the uterus. Shortly after this operation the patient became pregnant and was first seen by Bissel in the 31st week. Vaginal examination revealed a tumor in the cul-de-sac. "The impression given was that of a solid tumor of considerable size filling the right posterior segment of the pelvis, its position, size, and resistance so diminishing the capacity of the pelvis as would in my opinion cause dystocia at the time of labor." Cæsarean section or premature labor was advised, and the patient chose the latter. Examination under ether revealed the character of the tumor, which was the right kidney. In the knee chest position the kidney could be forced up to the promontory and maintained there. The cervix was dilated with bags and the child delivered by version and extraction. The kidney caused delay in the delivery of the after coming head which resulted fatally to the child. Patient was delivered on March 7th. April 10th, next, the patient underwent laparotomy. The right kidney, normal in size and appearance, was found behind the pelvic peritoneum. It could be raised to the promontory but 2 arteries coming from the neighborhood of the internal iliac or its branches prevented its further movement upward. When these were severed the kidney could be placed in its normal position. The renal artery and vein were elongated but came from their normal location. This was undoubtedly a case of a movable kidney which had become adherent in the pelvis.

My own case is as follows:

The patient was a I para, 21 years of age. The family history is decidedly tubercular, the mother and three sisters having died of pulmonary tuberculosis. The patient had typhoid fever at 16 years of age. About 2 years later she began to have acute attacks of pain in the right side, and frequently noticed that following these attacks she would pass large quantities of urine. She began menstruating at 12. Menstruation has been very irregular and painful. She last menstruated about December 1, 1909. Confinement was estimated for September 10, 1910, and on this day she came into the hospital. The preliminary examination showed the child to be in R. O. P. The pelvis was slightly contracted in its transverse diameters. On vaginal examination it appeared to be perfectly normal, and there was no mass of any sort noted in the hollow of the sacrum. This examination was made by Dr. William Mercer Sprigg. Under postural treatment the presentation became L. O. A. The patient did not go into labor until the 22d of October and had evidently conceived during a period of amenorrhœa. The membranes broke, following a few slight pains, at 11 P. M., October 22d. Up until 3 A. M. the pains were not severe, but from 3 to 7 the patient was in hard second stage labor. At the

latter hour the patient was first seen by me. The cervix seemed to be completely dilated and the head was engaged at the brim in L. O. A. The cavity of the sacrum was found to be filled by a mass presenting the shape, size, and consistency of a kidney. It was freely movable. Reflection caused me to believe that this could be nothing else but a floating kidney prolapsed into the pelvis. Recognizing the great rarity of such a condition I had the Resident wash up in order to make an examination. He immediately detected the mass to which I had called his attention, but during his examination the kidney was forced up above the brim of the pelvis, where it remained. Upon re-examining the patient no trace of the mass which just before had occupied the sacrum could be detected. A living child, weighing 8¾ pounds, was then delivered by forceps. The patient had a serious laceration of the right vaginal wall which caused considerable bleeding postpartum. Immediately following delivery the right kidney could be easily palpated, lying in the right iliac fossa. Three days later, at the time of repairing the lacerated perineum and vagina, the kidney was again made out and easily forced up to its normal position. It could be picked up in the abdominal wall. With the exception of a mildly febrile puerperium the patient had no further trouble and now, three weeks postpartum, is in satisfactory condition except for considerable pain in the back and right abdomen.

The great rarity of dystocia from the prolapse of a floating kidney into the pelvis is readily accounted for when one considers the combination of factors necessary to cause it: an extremely movable kidney associated with pregnancy, and its presence in the pelvis at the time of labor. The possibility of such a condition should certainly be borne in mind, however, as failure to recognize it might well be fraught with the gravest consequences, and in any case where labor is obstructed by a pelvic mass the possibility of the presence of a kidney should be considered.

It is obvious that no rules can be made regarding the treatment of such cases — every case must, of course, be individualized. Certain generalizations, however, can be made.

When the kidney is movable and the condition is recognized before labor, preliminary treatment by taxis and posture and great care and frequent examinations during labor should give excellent results. If the condition be first recognized during labor the kidney could probably in most instances be pushed out of harm's way above the pelvic brim, as in my own case. In other cases, however, this may be impossible because of adhesions, as in Bissel's case, or the advanced stage of labor, as in Gratschoff's case. In such cases Cæsarean section in the presence of a living child would be the operation of choice. If the fœtus were small and the obstruction caused by the presence of the kidney slight, a decision to extract the child past the kidney either by forceps or version might be made, but should be based upon a most thorough and painstaking investigation into the available space in the pelvis and the size of the child. For in case of an error in judgment on these points the mother would be in grave danger from shock and hæmorrhage as a result of the traumatism to the kidney and the child would also be in considerable danger, particularly if version and extraction were the means chosen for delivery.

In regard to the treatment of congenital pelvic kidney, complicated by pregnancy, Cragin (9) has reached the following conclusions:

"1. That pelvic kidneys may cause dystocia.

"2. That as a rule induction of premature labor timed according to the amount of the obstruction of the parturient canal is the procedure indicated.

"3. That in rare, exceptional cases, where the pelvic kidney is in a condition of hydronephrosis, vaginal nephrectomy may be advisable."

This would seem to be sound advice where the obstruction is not so great as to indicate the induction of labor at a period when the survival of the child would be very doubtful. In such a case Cæsarean section at term would certainly be indicated. When the condition escapes detection until labor is far advanced the choice would lie between craniotomy and Cæsarean section, depending of course upon the condition of the child. Version, as shown by the statistics of the collected cases, would seem to be too dangerous both to child and mother to receive serious consideration.

BIBLIOGRAPHY

1. Chapuis. Thèse de Lyon, 1895–96, tome xcvii.
2. Hohl. Archiv. für Anat. und Phys., 1828, No. 2, p. 177.

3. HEUTER. Zeit. für Gyn. und Geburt., 1880, v, p. 22.
4. FISCHEL. Prager. Med. Woch., 1885, x, p. 237.
5. MUNDÉ. N. Y. Med. Jour., 1888, xlviii, p. 48.
6. RUNGE. Archiv. für Gynäk,. 1891, xli.
7. ALBERS-SCHÖNBERG. Centralblatt. für Gynäk., 1894, xviii, p. 1223.
8. GOULLIOUD. De l'ectopie pelvienne congénitale du rein en Gynécologie et en Obstetrique. Ann. de Gyn. et d'Obst., Paris, 1895, xliv, pp. 117–127.
9. CRAGIN. Congenital Pelvic Kidneys Obstructing the Parturient Canal. Amer. Jour. Obst., 1898, xxxviii, p. 36.
10. BLAND-SUTTON. Lancet, 1901, i, p. 531.
11. DEWIS. Boston Med. and Surg. Jour., 1901, cxlv, p. 35.
12. RIBEMONT-DESSAIGNES AND LEPAGE. Précis d'Obstetrique, 6 ième Édition, Paris, 1904, p. 951.
13. GRATSCHOFF. Finska läkare sällskapets handlinger, Helsingfor, 1904, ii, p. 310.
14. BISSEL. A Successful Reimplantation of a Pelvic Kidney in the Female. With Remarks on the Surgical Treatment of Kidney Misplacement in the True Pelvis. Surg., Gyn. and Obst., 1910, xi, p. 66.

THE OPERATIVE CURE OF CICATRICIAL AND CONGENITAL DEFORMITIES OF THE FACE[1]

BY JOHN B. ROBERTS, M. D., PHILADELPHIA, PENNSYLVANIA
Professor of Surgery in the Philadelphia Polyclinic

IN THE development of eye, ear, nose, and throat specialists in recent years some practitioners have lost sight of the broad principles upon which all surgery of the face must be based. A tendency has, perhaps, existed to consider only a small section of the facial structures. It is desirable to obtain a wider view of the pathological conditions, wherein must be accomplished the work of the oculist, the otologist, the rhinologist, the dentist, and the surgeon. It is not sufficient for the operator to be acquainted only with the so-called surgical affections of this region. He must not forget that general affections, such as cretinism, myxœdema, and other disorders usually seen by the internist, are matters concerning which he must have knowledge to be efficient in the surgical work of the face.

Resort to reparative surgery of the face may be demanded to make good a loss by injury, as for example, of the framework of the nose; to supply a congenital defect, as in harelip and absence from birth of an ear, to relieve a deformity such as that due to fracture of the zygoma; to give motion to an immobile or otherwise useless eyelid; to construct a wall for the cavity of the mouth after gangrene, or gunshot wound of the cheek; or to give comeliness to a countenance disfigured by a horrid distortion due to the scarring of burns.

Dental operators have learned to accomplish astonishing results in orthodontia by the joint agency of retentive appliances, physiological development, and the employment of engineering methods in oral surgery. The surgeon, to be efficient in facial reparations, must use a similar combination of means. In addition he must have a good knowledge of the gross anatomy of the region, including the direction and character of the blood and nerve supply. He must also be familiar with the physiology and the mechanical relations of the organs of special sense.

A due recognition of the mechanical problems presented and a study of the physical as well as the physiological principles involved are essential to success. The inefficient results of surgical treatment sometimes seen after operative attacks upon severe facial disfigurements are evidences of the truth of this statement. A reliance, however, on the mere mechanical perfection of the technique will not be sufficient for success. The surgeon must have a comprehension of the value of nature's power of recuperation, when not impeded by septic infection of the tissues, and an ability to promptly recognize and successfully stop undesirable bacterial influences.

Surgical patience must also be a part of the equipment of the operator, as patience and faith in him must be a part of the mental

[1] Read before the Chicago Medical Society, November 16, 1910.

Fig. 1. Fig. 2. Fig. 3. Fig. 4.

Figs. 1 and 2. Florence K. Gunshot wound of face, carrying away the body of the mandible and the cheek on right side. Observe how chin and mouth have been pulled to the right by the scar contraction. Photographs taken before reconstructive operation to restore cheek, give control of saliva, and straighten chin.

Fig. 3. First step in making new cheek from skin of back, showing raw surface of dorsal flap. The skin side is towards the cavity of mouth. Jaw has been loosened and replaced and great gap in cheek filled with flap from back. The left half of jaw was held in place with caps on teeth and rubber bands. Observe improved position of chin and upper lip.

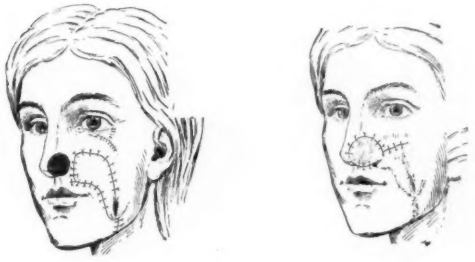
Fig. 4 Lateral view showing flap, to make new cheek, taken from back. The raw surface exposed was later covered with flap from chest.

attitude of the patient. Repetition of operation is so often necessary and time for nature to complete the work so absolutely essential, that undue haste and impatience must be barred from the very beginning of treatment to the end.

Permanent implantation of foreign substances, plastic and solid, in the tissues for the purpose of gaining rigidity or altering contour, success in transplanting pieces of skin, cartilage, periosteum, and bone, and the influences obtained by nerve anastomosis and changes in blood current, and examinations with X-rays, have given the modern plastic surgeon new powers.

Reconstructive surgery of the face is not restricted to the skin and fascia. It includes operations on the bones of the face and skull and mechanical work upon the teeth. The attainment of a proper occlusion of the teeth, the growth of the mandible, and the development of the accessory sinuses of the nose are most important factors in facial surgery.

Fig. 5. Florence K. Condition of patient ten months later. The restraint has been removed from the teeth. Further operations will be done to smooth down irregular nodules in surface of new cheek.



Diagrams to show method of treating cicatricial deformity from burn of face, which caused eversion of lower eyelid, eversion of upper lip, and total loss of the ala of the nose. A flap from neck was turned up to fill space in cheek left by cutting loose the cicatrix. A portion of this flap, *after* its adhesion, was used to close cavity of nose laid open by the sloughing due to the burn. Patient seen recently *very* greatly improved in appearance after a series of operations.

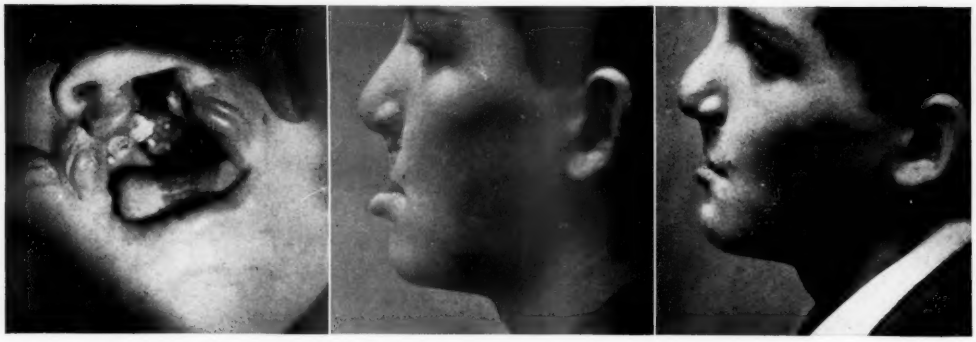


Fig. 1. Fig. 2. Fig. 3.

Fig. 1. Charles K. Double harelip and cleft palate. Boy of 14 years.
Fig. 2. Showing flatness of upper lip after operation on harelip. The lower lip was reduced by a "V" excision after this photograph was taken.
Fig. 3. Showing improvement after "V" shaped excision of portion of lower lip. Upper lip could now be made less tense by a plastic operation.

Sometimes a deformity may be corrected or an impending distortion prevented by mechanical applicances, intraoral or extraoral, alone. Depressed fracture of the zygoma is a good example of the need of correction of an osseous contour to relieve facial disfigurement.

Temporary resection of bone or temporary displacement of the soft tissues may be a necessary strategical move to gain access to the operative field. This is illustrated by the lateral displacement of the whole nose on a musculo-cutaneous hinge to enable the surgeon to reach a large disfiguring tumor in the nasopharynx. After removal of such a growth, the nose is replaced and no ugly scar need be left. Many operations can be made within the mouth without external scarring, provided that efficient instruments be used by trained hands.

The operator in these major restorations must be a surgeon trained to meet the emergencies of hæmorrhage, asphyxia, and shock. His assistants and anæsthetist cannot be tyros, unless the safety of the patient is considered to be unimportant. Sometimes preliminary control of blood trunks or temporary tracheotomy is demanded.

Congenital double lip — a rare deformity. Operation consisted in removing the internal lip. The furrows between the lateral portions of the inner and outer lips were lined with mucous membrane. Result of operation was excellent.

Congenital absence of nose — a very rare deformity. Patient seen in consultation with Dr. D. E. Kercher. Child had double harelip and double cleft plate. No nose or nostrils existed; a slight elevation in nasal region was palpable under the smooth skin between the eyes and mouth.

Fig. 1.

Fig. 2.

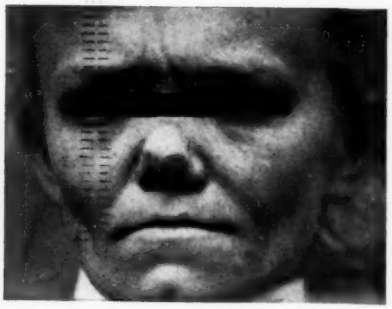


Fig. 3.

Fig. 1. Syphilitic necrosis of nasal framework. Improved by several reconstructive operations. Seen recently with considerable cosmetic benefit.

Fig. 2. Deformity due to syphilitic disease of internal structures of nose. Was improved by operation.

Fig. 3. Syphilitic deformity of nose, with loss of septum and columella. Refused operation.

The anæsthesia in surgery of the face is best obtained by using a hypodermatic injection of morphine, gr. ¼, and atropine, gr. 1-150, followed in about thirty minutes by inhalations of ether. The anæsthetic sleep may be continued during operation with small amounts of ether vapor, or chloroform vapor, pumped into the mouth or nose by means of a rubber bulb attached to a bottle with an exit tube. A trained assistant should always perform this service, lest postoperative ether pneumonia or sudden chloroform death occur. It is probable that a hypodermatic injection of hyoscine hydrobromate, about fifteen minutes after the injection of the morphine and atropine, lessens the amount of ether required to produce freedom from pain. The dose should be from gr. 1-100 to gr. 1-50.

The external incisions should be made parallel to, or in the normal wrinkles in the face and not across them, so far as is possible. The portions of the face ordinarily in shadow are regions in which scars will be little seen. Behind the ear, under the brow, and below the jaw or chin, are such elective situations. By raising the upper lip or depressing the lower lip cuts may often be made inside the mouth and thus avoid visible scarring. Extensive operations on the bones may be made by these routes. Curved incisions make comparatively inconspicuous scars.

There are various methods of obtaining the tissues needed to restore lost structures, or to replace those moved after correcting cicatricial displacements. Flaps of skin and fascia may be cut in a manner which will leave their circulation and innervation comparatively good, because a pedicle remains to connect them with the general circulatory and nervous system. Such flaps will usually survive the change in position, even if there is some diminution of blood supply due to the bending and twisting of the footstalk. Tension must not be great on the pedicle. One of the difficulties in plastic surgery of the face is the frequent impossibility of preventing some septic soiling from secretions of the eyes, nose, or mouth. Hence the pedunculated flaps are greatly employed. The asepsis should at least be not too defective during and after operation. Grafts, or free

Infant with growing angioma of tip of nose. Operation was refused on behalf of patient.

"Dog faced man" before and after operation. Treated by excision and flaps from arm, neck, and forehead, and skin grafting. Further improvement is possible by further operative treatment.

flaps, which are so called because they have no pedicle, are more liable to become necrotic on the face than in many other regions of the body because of the frequent failure in asepsis. Grafts of skin cut after the methods of Réverdin, Thiersch, Wolfe, or Krause are used, however, satisfactorily at times.

When proper cellulo-cutaneous material cannot be obtained from the regions of the face or neck, it is not difficult to transport a portion of skin and fascia from the thigh or abdomen. This is done by raising a flap from either region, leaving a broad pedicle to maintain its circulation. The raw surface of the flap is then sutured to a raw surface made on the hand to receive it. The hand is fixed by dressings of gypsum to the thigh or abdomen for 14 days. After the lapse of that time the flap is cut loose from the thigh or abdomen. It has grown to the hand. Later the hand is lifted to the face, and the flap, now having its circulation from the vessels in the hand, is used to repair the gap in the face. Subsequently it is modeled into the requisite shape.

A somewhat similar method is to fix the arm or hand to the face, by cutting and stitching a properly shaped flap from the surface of the arm or the palm of the hand,

Large vascular tumor of upper eye lid and brow. Operated upon by ligation, cautery, excision, boiling water, and skin grafting. Eye brow and upper lid made from hair and skin of scalp, after removal of tumor.

Child with drooping auricle.

Child with drooping auricle. Outlines of the operation.

A case of congenital deficiency of auricle.

A *B*

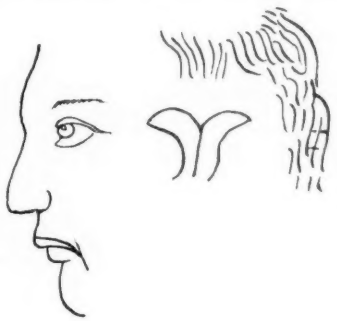
Congenital absence of right ear (except lobule). *A* The normal ear. *B* The new ear on other side in process of manufacture. It is large to allow for shrinkage and further modeling. The position and the projection above surface is apparently quite good. Expect to gain a fair final result. The child will need several additional operations.

leaving only a pedicle attached to that member. The pedicle is divided after about 14 days.

Bone grafts may readily be cut from the ribs or tibia and transplanted into the face. A toe has been grafted on the hand and transplanted to the face to aid in reconstructing a nose. Periosteal and cartilaginous grafts may be readily obtained from the costal region of the chest. Sometimes osseous grafts are shaved from the cranial bones.

When it becomes necessary to give rigidity to the reconstructed part of the face cellulocutaneous flaps may be superimposed by repeated operations until the resulting fibrous mass becomes stiff enough to answer the purpose. If this method is unsatisfactory, strips of cartilage, periosteum, or bone itself may be transferred or transplanted into the flaps. These schemes answer in rhinoplasty and otoplasty. Sometimes these are cut at the time of operation and at once enclosed in the reparative flaps. At other times they are planted near the region to be repaired, and are allowed to become attached to the surrounding tissues by vascular connections. Later a flap containing the rigid graft is cut and used for the plastic operation.

Rigidity may also be obtained by introducing into the subcutaneous tissues paraffine, or compositions containing paraffine, in a fluid state, which subsequently become hard by cooling. The paraffine should have a



Roberts's incisions for making an auricle in congenital absence of external ear. The flaps are to be turned on edge and united, raw surface to raw surface, by through and through stitches and marginal stitches. The thick flap, with skin on both external surfaces is then to be mortised into the integument of the head, in which the necessary curvilinear cut has been made. Later rigidity is to be given by planting shavings of cartilage from the costal region. Further modeling later will be needed.

Diagram showing incisions for decreasing size of gigantic auricle.

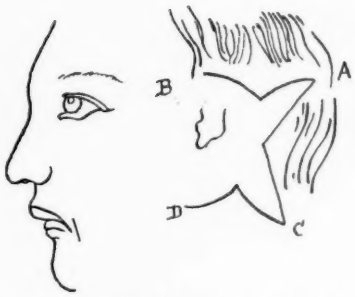


Fig. A. Szymanowski's incisions for making an auricle in congenital absence of auricle.

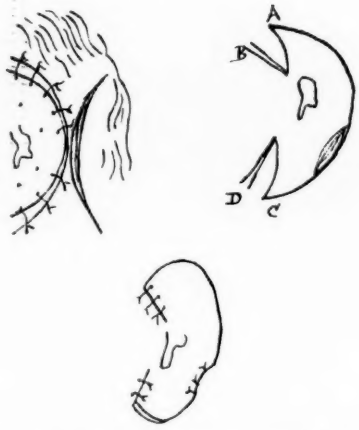


Fig. B. Szymanowski's method of modeling an auricle after a crude auricle has been made by incisions shown in A.

melting point of about 105° to 110° F. It is melted and sterilized by heat, and injected under the skin, previously sterilized, by means of a hypodermic syringe and a needle with a rather large bore. Before the plastic substance becomes entirely hardened in cooling it may be moulded with the fingers. This method of operating is very valuable in cases of saddle-nose of mild grade. Occasionally plastic operations are made more effectual by giving solidity or rigidity to the tissues by the insertion and encapsulation of glass or metal globes, as in the eye, plates of metal or celluloid, or wire filigree.

THE BEST METHOD OF EXPOSING THE INTERIOR OF THE BLADDER IN SUPRAPUBIC OPERATIONS

By HOWARD A. KELLY, M. D., Baltimore, Maryland

THE bladder is awkwardly placed for delicate surgical operations. It lies too far within the pelvis, and in men in particular it is too well protected by muscular and tendinous structures to make it easily accessible from below, except for such an operation, for example, as a simple incision and the extraction of a calculus.

The suprapubic route is also an awkward one, as it opens widely the loose, easily infected areolar tissues of Retzius' space, with the peritoneum close at hand and easily injured, and the bladder itself lying deep in the pelvis and relatively inaccessible.

These objections do not hold when there is a calculus of considerable size to be removed, but when the lower lateral walls or the base of the bladder must be reached, and any delicate surgery must be done, the operator often finds himself greatly embarrassed, particularly if the patient is stout.

The chief difficulty in reaching and exposing the bladder comes from the resistance experienced in drawing aside the recti muscles with their overlying fasciæ. The operator works at a great disadvantage in the lower angle of a rigid V, and every urologist of experience, I am sure, has at some time or other reluctantly cut the recti so as to get the wider exposure demanded by the difficulties of the projected vesical operation. It is always unfortunate to be obliged to resort to this expedient as, if for any reason the wound fails to heal well, the sutured

Fig. 1. The patient in the Trendelenburg posture with the incision made about 1 inch above the symphysis pubis through the skin and fat down to the fasciæ, semilunar in form with its concavity directed towards the navel.

Fig. 2. The skin and fat dissected up from the abdominal wall, exposing the deep fasciæ covering the recti and at the outer angle of the wound a part of the oblique muscles.

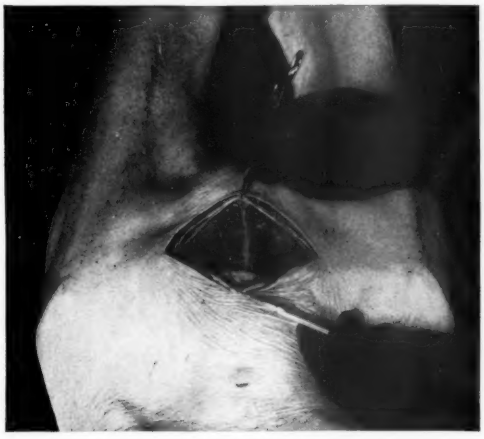


Fig. 3. The strong abdominal fasciæ covering the recti and the oblique muscles dissected free from the underlying muscular tissues. This can be done with the blunt dissection except over the linea alba, where it must be cut.

Fig. 4. The flaccid recti no longer splinted by the streng fasciæ above are easily drawn aside by retractors, giving a maximum exposure of the bladder which now rises up into view and fills the field as it is distended with air by the hand between the legs squeezing a rubber bulb. The rounded fold of tissue above the bladder towards the valen is the reflection of the peritoneum onto the bladder attachment.

Fig. 5. The bladder fixed by two guy silk sutures is now carefully opened in a from-side-to-side and layer-by-layer dissection. If the bladder has been emptied, or nearly emptied, beforehand, there will be no escape of fluid and no contamination of the wound, which can be perfectly protected.

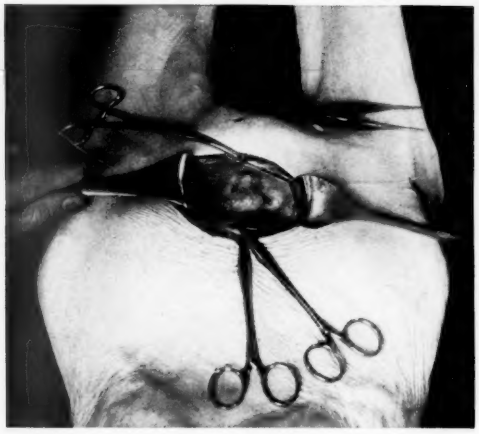


Fig. 6. After making a longer incision in the bladder, large retractors an inch or more in diameter can be inserted perfectly exposing all parts of its base, as here shown. In the figure the ureteral orifice is seen darkened by a large hemorrhoidal vessel projecting out of its lumen on the right side. The two ureteral orifices also come plainly into view. Each one has been touched with a droplet of ink on the end of a straw to mark its position. The right orifice lies higher than the left.

Fig. 7. After concluding whatever vesical operation it has been necessary to do and sewing up the bladder, the recti are approximated by catgut sutures. The first suture is here introduced.

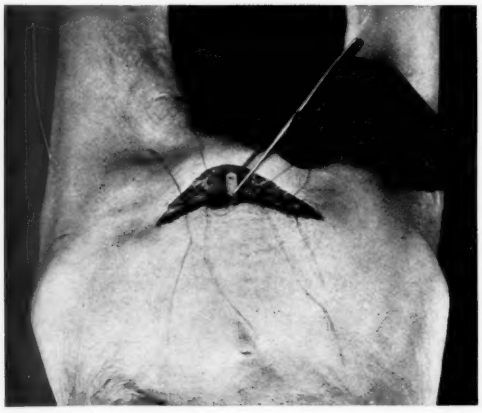


Fig. 8. The fasciæ underlying the recti and the oblique muscles shown divided and retracted in Fig. 3 are here shown united by suture. A drain has been dropped into Retzius' space to take care of any possible contamination.

muscles and fasciæ pull apart, a diastasis is formed, and a bad hernia is the result.

I hit some time ago upon a plan which I believe is a valuable one, and which is new as far as I can ascertain; a plan which obviates the difficulties mentioned and renders the interior of the bladder accessible with the utmost ease. The method will be best illustrated by a running description of the following eight diagrams:

Figure 1. The patient is put in the Trendelenburg posture, after first emptying and cleaning out the bladder, and introducing a mushroom catheter large enough to fill the urethra. A semilunar incision is made through the skin and fat of the lower abdomen about one inch above the symphysis pubis, concave towards the umbilicus and about six inches long. The small bleeding vessels are controlled.

Figure 2. The dissection of the upper skin and fat flap away from the deeper tissues is next made, when the deep fasciæ overlying the recti muscles and the adjacent oblique muscles out beyond the semilunar line are clearly exposed in a cleanly manner. It is well to make a good, clean anatomical dissection.

Figure 3. The next step in the procedure is to divide the deep fasciæ also from side to side without cutting any of the underlying muscular tissues. This division may extend well beyond the recti as shown in the figure. The fasciæ are now freed from the muscles with the blunt dissection. To effect this detachment it is as a rule only necessary to push the gloved finger up between the muscles and fasciæ. In the median line, however, the detachment must be made by means of scissors or a knife.

Figure 4. When the loosened fasciæ have been drawn up and down, the underlying flaccid recti muscle bellies are exposed and easily retracted to the right and to the left, and this affords an extraordinary avenue of approach to all the tissues lying between the peritoneum (seen as a roll in the upper part of the wound near the point of the forceps lying across the abdomen) and the symphysis pubis. An inflating rubber bulb is now attached to the mushroom catheter in the bladder and squeezed so as to fill the bladder with air and to bring it right up into the wound. The bladder is the transversely oval, whitish body, with several vessels on its surface at the vertex. The empty bladder exposed and brought up into view and within easy touch in this way is now caught by two guy sutures (Fig. 5) and incised in transverse direction between them. For first recommending this incision I gladly yield to the prior claims of the distinguished French urologist Legueu, who advocated the transverse vesical incision in 1907 (Presse méd. No. 29, p. 226).

If the opening is carefully made, there need be no contamination, as the bladder is held up by the guy sutures and will not sputter its contents into the wound. As soon as the bladder is cut into the opening is enlarged as much as may be necessary from side to side. There is no danger of contaminating the wound with any infectious vesical contents, which can easily be dried out. The transverse incision is decidedly the best one for the bladder as it gives the widest possible opening, parallel to the opening in the fasciæ of the abdominal wall, and perfectly avoids all risk of injuring the peritoneum. The incision lies also parallel to, and not across the course of, the vesical vessels.

Figure 6. The free exposure secured by such an opening in the bladder is seen in this figure. The base of the bladder is brought perfectly into view and is easily accessible for all operative procedures. In the case before us the urethra, which contains a hemorrhoid on the right side, and the irregularly placed ureteral orifices, come fully and plainly into view. After completing whatever operation the circumstances of the case may demand (Fig. 7) the operator closes the bladder by such method as he prefers, with or without drainage, taking care to utilize the perivesical fasciæ in the outermost row of sutures, he closes the abdominal wall down to the little suprapubic drain if one is called for.

By first uniting the recti with catgut and then (Fig. 8) uniting the deep fasciæ of the abdominal wall, leaving room in most cases for a small drain in the median line, the operation is completed.

THE SIGNIFICANCE OF THE LANE KINK OF THE ILEUM

By FRANKLIN H. MARTIN, M. D., Chicago, Illinois

I BECAME interested in the Lane kink of the ileum while visiting the Rochester clinic for a period of some ten days during July and August of this year. During these few days I saw more than a dozen well marked cases, as they were demonstrated and cared for, in connection with interval appendicites and other abdominal pathology.

Since my attention was called to the matter there, I have had an opportunity of studying six definitely defined cases in my own work in patients operated upon by me for different abdominal conditions.

The discoverer of this condition attributes the cause to a pull upon the end of the ileum by a prolapsed cecum, the exact cause of the kink or bend being a counter pull on the ileum by its mesentery about three inches from its attachment to the cecum.

From a somewhat careful observation of a limited number of cases, I have concluded that the kinking of the ileum within four inches of its cecum attachment instead of elsewhere, is due to the fact that the ileum at its termination in the large bowel possesses an extremely short mesentery, viz., from one to two inches. Given this comparatively fixed portion of the compressible tube, there are two factors which lead to its distortion (a) a too movable or displaced large bowel, and (b) an abnormal disposition of the remaining portion of the small bowel or other viscera.

It is safe to assume, I think, that a pathological kink of the ileum is not liable to occur at this location if the large bowel to which it is attached and the balance of the ileum and other viscera are normal and in their normal positions.

The different conditions I have observed accompanying pathological kinks of the last six inches of the ileum are as follows:

(a) An extreme prolapse of the cecum and ascending colon resulting in an inverted V shaped kink, the apex of the bend being four inches from the ileum's attachment to the cecum with the right arm of the V adherent to the colon, the two arms of the V being closely approximated and adherent, with their two portions of mesentery adhered together, resulting in a marked narrowing in the lumen of the bowel.

(b) Extreme prolapse of the stomach, with transverse colon prolapsed, beneath the stomach, the small intestines filling the pelvis and lower abdomen underneath the stomach and colon, resulting in a definite right angle kink of the ileum near its attachment to the cecum and a V shaped bend with its apex attached to the broad ligament with the two arms three inches in length approximated, and their mesenteries thickened and adherent to each other and the walls of the intestines.

(c) In which both cecum and small intestines are prolapsed, and where a tendency to general visceral prolapse is present, resulting in a variety of kinks in the last six inches of the ileum due to pull upon its short mesentery, the shape and direction of the bend depending upon the particular influence exerted upon it by the abnormal position of the viscera surrounding it. A most common form of kink that I have observed in these cases is a horseshoe bend with a three inch curve, the concavity of the curve looking toward the diaphragm, and the bowel at the center of the curve attached to and rolled in the left leaf of its mesentery, materially obstructing its caliber.

The kinks or bends in my opinion are due, therefore, to a decided displaceability not only of the cecum but of all the viscera surrounding the last three inches of the ileum, traumatizing it by undue pulling on its distal end in the case of the cecum, on its proximal end in the case of the balance of the ileum, or by pressing upon it and its attached mesentery, and grinding their opposing surfaces together in case of marked displacement of the superimposed viscera, such as the right kidney, the liver, or stomach.

This brings me to the consideration of another point I have observed in regard to the etiology of these kinks. In practically every case where I have noted the condition,

it has occurred in the so-called neurotic type, or congenitally defective individual marked by defective nutrition, little fat, flabby muscles, deficient elimination, foul breath, muddy skin, and sour perspiration.

While at first glance, one would be inclined to attribute the picture exhibited in these individuals to a toxæmia resulting from intestinal stasis, due to the kink, I believe that an inherent defect in development in these individuals makes the kink in the ileum probable, and following that defect, other symptoms due to intestinal stasis and toxæmia supervene.

Without going into tiresome detail of the comparative anatomy of embryological development of the human animal or the evolution of man, we may recall the following facts which have to my mind a strong bearing on our subject. We know that lower animals, when fully developed, have a disposition of their abdominal viscera and the skeleton bones, different from the arrangement in the perfectly developed man. Conspicuously, those differences are as follows:

All the peritoneal attachments in the lower animals are looser. The liver, spleen, duodenum, kidneys, ascending and descending colon, all have loose attachments or mesenteries. In the perfectly developed man, the liver, duodenum, ascending and descending colon, are firmly fixed to the abdominal parieties. In the quadruped the abdominal viscera are arranged with long mesenteries which allow them to fall forward and be supported by the belly walls, hammocklike, the side walls of the abdomen being constructed of strong fasciæ which support without effort the superimposed load.

In man, who walks perpendicularly, the hammocklike belly of strong fascial support is useless, and for it belly walls of strong relays of thick muscles are substituted, which have for their object, the constant maintaining, by unconscious automatic contraction of the various groups of muscles, of the different zones of viscera at their proper level. This too is aided by shortened mesenteries of the necessarily movable organs, and the firm blending of broad areas of the larger and heavier viscera directly with the parietes.

In the quadruped the sacrum and the pelvic bones are a direct line continuation of the spinal column and the spinal column itself is straight or has a general convexity posteriorly. As man in his evolution becomes a biped the sacrum rotates backward, on the spinal column, retaining thereby its same relation with the horizontal and with the femur extension which is made necessary as the animal assumes the perpendicular. The pelvic cavity by this evolutionary change assumes a position nearly at right angles to the spinal column and the spinal column itself, which co-operates in this change, bends forward in the lower dorsal and upper lumbar regions to again curve backward in conformity with the direction of the sacrum. This right angle position of the human pelvis with its overhanging promontory of the sacrum and the forward bend of the lumbar spine, which shunts the intra-abdominal pressure of viscera forward onto the muscular pyramids of the lower abdomen and the pubic arch and thus keep them out of the pelvis, protects the contents of the pelvis from too much influence from the abdominal contents.

The great relevance of all this rehearsal of well known facts is apparent, when we appreciate that a large number of human individuals we have to treat as patients, have through arrest of the process of development in embryo or early life, through an evolutionary defect in their immediate progenitors, or as a result of reversion of development in either of these directions, possess many of the developmental characteristics shown as normal in the quadruped.

The defects that I particularly wish to call attention to are (a) failure of the ascending and descending colon to become fixed to the posterior parietes, (b) failure or partial failure of the liver, pancreas, spleen, and duodenum to become fixed, and persistence of a general looseness of peritoneal attachments, (c) failure of the abdominal walls to be transformed from a characteristically fascial bag typical in quadrupeds to an adequate relay of strong muscles, with arrangement and position calculated to maintain properly the abdominal viscera, (d) the persistence of a straight spine and failure of

the pelvis to rotate to a position at right angles to the perpendicular of the spine.

An individual with these defects more or less exaggerated has a characteristic appearance; long arms, slight or no curve forward of the spine in the lumbar region, in other words, a straight back, forward projection of the cervical vertebræ, head forward, flat chest walls, a perpendicular pelvis, and a preternatural projection of the lower third of the abdominal wall, with poor muscular development in its several layers.

A physical examination of these individuals will reveal low stomach, movable kidney, a low riding liver, and in women a retrodeviated uterus with different degrees of descent. The abdominal walls are soft and atonic, the cannon ball like projection in the lower zone of the abdomen indicates its lack of supporting power, and the crowding of its walls indicates a general visceral descent into its cavity.

The cardinal symptoms complained of by these individuals are: extreme weakness, giving rise to disinclination to stand or walk, dyspeptic symptoms, characterized by anorexia, distress after eating from a feeling of distension rather than pain, eructation of gases, and frequent colicky pain in lower abdomen. Patients are relieved by lavage and experience the greatest comfort when on a simple and inefficient diet. They are usually constipated. Backache from several sources is complained of from pulling on the mesenteries, from dragging of the kidneys, from distension of the lower bowel, and from displacements of the uterus.

The above symptoms with others are common to all cases of general visceral prolapse, but more definite localizations are frequently revealed as the condition progresses.

The most common complication is periodic attacks of appendical colic, followed by slight inflammatory spells relieved by recumbent position and dieting, which finally develops into a constant pain of mild degree and rather extreme sensitiveness to pressure.

As the case progresses the chronic dyspeptic symptoms increase and occasional attacks simulating mild chronic obstruction of the bowels will be revealed. These are relieved by the recumbent position, lavage, starvation diet, and enemas. The attacks become more frequent, the pain in the region of the appendix becomes more severe and extends toward the umbilicus. During the attacks characterized by the partial obstruction symptoms, the area of tenderness is increased and some tympany is revealed to the right and below the umbilicus.

The patient in the meantime is being poorly nourished and symptoms of general toxæmia, from intestinal absorption, are apparent. This class of patients often develop extreme anemias. Occasionally severe crises develop which may be interpreted as gall-stone colic, ureteral or appendical colic, or acute obstruction of the bowel. *They are relieved by the recumbent position, rest, and dieting.*

The symptoms reappear as the perpendicular position is assumed and active exercise is indulged in. Stomach findings and feces examination are not conclusive. The desperate condition of the patient with the definite appendix tenderness justifies and demands an exploration. A right rectus incision is selected as one that will allow thorough exploration of stomach, gall-bladder, kidneys, and appendix. The stomach is normal. The gall-bladder is thrown well forward by a low loosely attached liver, it is distended with fluid but empties under gentle pressure. No gall-stones. The right kidney is extremely movable and can be moved in a circle with a circumference of ten inches. It can be lowered to the true pelvis and it can be replaced into its normal location. The appendix is at first obscured, but by drawing up the cecum, which is prolapsed into the pelvis, the inch end portion of the appendix beyond its mesentery, distended and blue, is revealed; the balance of it is beneath the cecum where it is pulled by its highly attached mesentery and blood supply, frequently buried in adhesions, or adherent to the under surface of the cecum, with a definite bend and usually an obstruction at its junction, with the distal end representing the uncovered inch.

The appendix is carefully removed. The loose freely movable cecum is now drawn out and with it the first six inches of the ileum. At first it may be difficult to demonstrate

this portion of the gut because of adhesions or because of the short mesentery. As an attempt is made to spread out the intestine, the definite kink will be revealed. It is not only bent to the extent that its lumen is obstructed, but it is rolled or wrapped in its own mesentery, to one leaf of which it is firmly adherent, to from one-fourth to one-half of its circumference, and to that extent still further obstructed in its lumen.

As the kinked intestine is placed on a gauze sponge and slight tension made on it, the adhesions are revealed and as they are carefully divided by scratching through them with the point of a knife, the bent and imprisoned intestine is relieved and its obstruction is immediately overcome.

As the adhesions are divided and the intestine resumes its former condition, thickened portions of the mesentery are revealed, showing an hypertrophy that developed in consequence of strong pull on it. The leaf of the mesentery representing the portion adherent to or wrapped about the gut will exhibit triangular raw surfaces, showing the extent that it imprisoned the gut.

Careful examination of these kinks leaves practically no explanation for their formation except the one of traumatism to the comparatively fixed portion of the intestine, due to an abnormal descent of the cecum, the balance of the ileum and the overriding of superimposed viscera.

The congenital or evolutionary defects that I have called attention to, abundantly account for conditions which would inevitably lead to traumatism of the ileum. And these congenital defects are not mere speculations, they exist in different forms in a definite number of individuals that we see daily. Treves, for example, found the unattached ascending colon in 26 out of one hundred cases; the unattached descending colon in 36 out of one hundred, while both occurred in 14 out of one hundred.

For a number of years, I have been in the habit of examining at all abdominal operations where there were not contraindications, the different viscera of the abdomen and pelvis, in which I noted especially their movability and their attachments. Many of these cases have been chronic invalids and naturally would show a large percentage of defects, but even then it is surprising how many have shown the unattached livers, unattached ascending and descending colons, loose peritoneal attachments, unformed ligaments, and the necessarily displaced viscera.

The other class of cases in which visceral misplacement occurs and in which intestinal kinks may develop includes those individuals who acquire visceral displacement from dislodgement of the organs due to a sudden absorption of fat. This will not only loosen the organs in their locations as rapid absorption of fat will loosen a kidney, but it will attenuate the mesenteries and lengthen them, loosen ligamentous attachments and peritoneal attachments, and increase the roominess of the abdominal cavity by removal of fat padding and cause the parietes to become unduly lax by removal of fat layers. Parturition followed by subinvolution of the abdominal muscles due to any cause, would leave a capacious abdominal cavity and flabby abdominal walls, in which visceral disarrangements and kinks may develop.

One of my cases was of this latter type. Rapid childbearing, sepsis developed at one childbirth. A long tedious convalescence followed, with marked loss of flesh. The woman became an invalid with backache, bearing down pain, and constipation, and finally developed pain in the right side with symptoms of intestinal stasis, and the usual train of symptoms of toxæmia. The case presented gynecological pathology sufficient to justify operative interference. At the same time, a right rectus incision revealed a prolapsed cecum with a large appendix adherent beneath it having a bulbous end with a bend behind it, and a well marked kink of the ileum which effectually narrowed the lumen of the intestine at the bend and also at the portion wrapped in its mesentery and adherent to it. This woman had a freely movable right kidney which doubtless by pressure forward had detached the ascending colon and caused descent of the head of that bowel. The baggy atonic abdominal walls allowed a descent of the small intestine, and other viscera.

What is the pathology of the adhesions about the mesentery and the walls of the intestine in the Lane kink which makes the kink permanent? It seems to me that several explanations may be given. First, a constant pull upon the portion of the bowel with the short mesentery causes a thickening and hypertrophy due to the constant traumatism. Second, the intestine from becoming an involuntary ligament for the descending neighboring bowels to which it is attached, becomes attenuated, its circulation is disturbed, fecal stasis exists in its lumen, bacterial invasion occurs through its tissues, and peritoneal or mesenteric adhesions occur as the result of the local infection. Third, the direct mechanical grinding of the opposing peritoneal surfaces of the bowel against the unyielding opposing peritoneal epithelium of the mesentery leads to non-bacterial plastic inflammation, with adhesions. Fourth, adhesions occurring as the result of secondary infection extending from the appendix or the tubes.

What then, if these kinks are an established fact, are we to do about them?

First, until we learn a sure method of diagnosing them, we should carefully look for them in all cases on which we operate for obscure abdominal symptoms, especially in chronic appendicitis, salpingitis, stomach ulcer, and colocystitis.

Second, we should learn to suspect their presence in all cases where visceral ptosis can be demonstrated, especially in the congenitally defective individuals, in those who have for any reason lost fat rapidly, in females suffering invalidism as the result of subinvolution of the abdominal muscles, and when these are obscure symptoms of intestinal stasis, distress in the right lower abdomen, with or without obscure appendix symptoms.

I believe that the condition is one of great importance. I believe that operations will be considered justifiable for this condition independent of other pathology. I believe that it gives rise to a number of symptoms that have been attributed entirely to chronic appendicitis. I believe that many failures to obtain relief after appendectomies which failures have been attributed to postoperative adhesions, are due to an overlooked kink of the ileum. I believe that a proper recognition of this condition and an appreciation of what its capabilities are for harm, will lead us to re-operate a lot of our appendicitis cases, who have failed to find relief from simple appendectomies, and to straighten out their obstructed ileum, the real cause of their symptoms.

Within the last month, I have followed this course in one of my cases, on which I operated two years ago for appendectomy. She was of the type I have described. Her old appendicitis symptoms were still present with symptoms of periodic attacks of intestinal obstruction which were relieved partially by diet and rest but which left the woman an invalid. She had extreme anorexia, and the little food she could be induced to take distressed her greatly. She possessed the characteristic toxæmia so well described recently by Mr. Lane and who attributed the cause to intestinal stasis. The operation showed the head of the colon absolutely free of adhesions, but the last three inches of the ileum was markedly kinked and its lumen almost shut off by the compression of the soft bowel by its mesentery in which it was wrapped and adherent. Separation of the adherent mesentery completely straightened the intestine and restored its lumen.

The treatment of the kink that I have described must consist in a preliminary operation procedure. For a long time to come the operation will probably not be performed for that condition alone but as a sequel to other procedures for which the abdomen is opened. The operation is extremely simple and can be accomplished through any kind of an opening that will allow the operator to reach the cecum. In another portion of this paper, I have described the simple details of the operation. It will immediately occur to you, what is to prevent the adhesions re-forming, and the kink re-establishing itself?

Unfortunately there is little that we can do to cover up these opposing raw surfaces that we have exposed, as a result of separating the adherent parts. We should replace the prolapsed large bowel, which contrary to the normal condition possesses a mesentery or

loose peritoneal attachment and which has consequently dragged a kink into its fellow. We can arrange the balance of the small intestines in an advantageous position with the aid of the Trendelenburg position, and we can use the omentum as a protector and a temporary bolster to the intestines, that are prone to occupy the pelvis, and finally while the patient is still in Trendelenburg position, we can close the wound, and eliminate much of the too capacious lower abdomen by a firm abdominal adhesive plaster corset, with a strong reinforcement of pressure pads and adhesive straps immediately above the symphysis. In a word everything in the way of position and temporary support should be brought into requisition to prevent visceral descent and a re-establishment of the bend.

It must be taken for granted that the Lane kink of the ileum will relapse, if the individuals in which they occur possess inherent defects which have caused them, unless some means is devised to overcome the results of such defects.

This is a problem that has tried the ingenuity of hygienists, mechanical therapeutists, and anthropologists, ever since the days of Glenard. My experience in these particular cases has been so small that I can give no advice based on successful experience. My experience in treating visceral ptosis however, would lead me to advise for treatment of the congenitally defective individual who has had a kink of the ileum straightened, (a) the constant support of the abdomen while in the upright position with an efficient abdominal support, such support being applied while the individual is in steep Trendelenburg position with the viscera gravitated toward the diaphragm, (b) thorough mechanical therapeutics, such as massage, or mechanical massage of the abdomen while in Trendelenburg position, at least once a day with or without the support, special effort being made to knead the viscera toward the diaphragm, (c) a carefully regulated diet that would have for its object the fattening of the patient.

The above treatment is rational and would have to be continued indefinitely for the congenital defects, but would give relief and doubtless result in a cure to the individuals suffering with acquired defects.

CONCLUSIONS

1. The Lane kink of the ileum has its location in the last six inches of the intestine at and before its attachment to the cecum.

2. The pathology occurs at this point of the ileum because of the comparatively fixed condition of this part of the gut due to its short mesentery.

3. The actual cause of the bend in the intestine and the adhesions complicating it and the change in its mesentery are due to traumatism as a result of the prolapsed cecum dragging upon it, or the pulling of the balance of the small intestines upon it, or the grinding of superimposed viscera that are subject to abnormal descent upon it.

4. The pathological anatomy exhibited in the kinks are (a) bending of the ileum in one or more places obstructing its lumen, (b) shortening and thickening of its mesentery, (c) adhesions of the folds of the mesenteries together, (d) adhesions of the arms of the kinked bowel to each other and to other intestines, (e) rolling of the intestine in its own mesentery and adhesions to it in such a way as to materially lessen its lumen.

5. The causes of the descent of the cecum, the small intestine, and the superimposed viscera, which apparently precipitate the pathological kink, are (a) a congenital defect in the individual in which mature blending of the peritoneal surfaces failed to materialize, and (b) acquired defects which weaken the supports of the abdominal viscera.

6. The symptoms are (a) acute, colicky pains, (b) a dull steady pain due to chronic stasis subject to exaggeration when the intestines are overloaded. The location of the pain being according to Lane, one inch below and to the right of the umbilicus, (c) occasional attacks of acute and subacute obstruction relieved by recumbent position and dieting, (d) anorexia, (e) indigestion with a tendency to large gas formation, (f) general toxæmia due to intestinal absorption.

7. The treatment (a) laparotomy, separating of adhesions, straightening the intestine, replacement of the organs causing the kink,

(b) rearranging viscera with omentum employed as a protector and bolster, while the patient is in the Trendelenburg position, (c) application of strong supports, adhesive plaster corset, reinforced by pressure pads on lower abdomen, held tight by adhesive straps, (d) constant wearing of abdominal supporters applied in Trendelenburg position, supplemented each day by abdominal massage, administered while in Trendelenburg position.

HÆMORRHAGE OF THE NEWBORN; TREATMENT BY DIRECT TRANSFUSION OF BLOOD

Review of the Literature. Report of a Case

By V. D. LESPINASSE, M. D., and G. CARL FISHER, M. D., Chicago, Illinois

HÆMORRHAGE of the newborn, or so-called melena neonatorum, is a most sharply defined and easily recognized disease. The disease diagnoses itself; it is the only condition which may cause severe hæmorrhage in the first week of life, except trauma. Hæmorrhage of the newborn is entirely distinct from hæmophilia. Hæmophilia never occurs during the first two weeks of life, while hæmorrhage of the newborn always occurs then and usually before the fifth day. Hæmorrhage of the newborn is quite common, occurring once in a thousand births.

ETIOLOGY

The etiology is attributed by different authors to different conditions, namely:

Asphyxia. Lesions of the vasomotor center (Ponorski). Hepatic diseases, icterus, etc. Degeneration of capillary walls. Obstruction of bile ducts. Lues is a cause in from 2 to 6 per cent (Holt); conversely, 132 cases of congenital syphilis, 14 per cent had hæmorrhages. Embolism of gastric and mesenteric arteries (Landau). Duodenal ulcer. Sepsis. Of 61 cases of hæmorrhage of the newborn (Epstein), 29 had sepsis; 190 cases (Ritter), 24 had sepsis. Hypoplasia of blood; no fibrin ferment formed.

In this connection I quote Dr. Brewer's comment on the first case operated. "The latest accepted theories of melena neonatorum point not to ulceration or to gross lesions, but to the capillary blood-vessels as the source of the bleeding, and the clinical picture of these cases is undoubtedly very like that of an infection as the etiological factor. But the course and the remarkable cure of the case reported here would seem to disprove both the infectious theory of its origin and the blood-vessel explanation of the diapedesis of red cells and undisturbed osmosis resulting in the capillary hæmorrhage. At time of operation the baby was in a dying state and had palpably only a few hours to live, immediately after, the baby was in perfect health. There was no period of convalescence. Such a sudden change in condition could not be due to a structural generation in the capillary vessels nor to a sudden overcoming of an infection; clinical experiences will permit of no such inference. Neither the crisis of a pneumonia nor the relief of a spasmodic croup can be compared with the observed fact in this case, either from the point of view of reversal of pathological condition or of elapse of time necessary to bring it about. The only possible explanation of so rapid a change must be found in a chemical condition of the blood. And the final conclusion as to the nature of the disease is that melena neonatorum is a congenital malformation of the blood of unknown chemical nature. The solution of the problem of its etiology is to be found in a chemical study of the processes of osmosis in the capillary vessels, of the chemistry of the coagulation of the blood, and along kindred lines which are for the most part new and untouched."

SYMPTOMATOLOGY

The most important as well as the most striking symptom is hæmorrhage. This hæmorrhage may be into the stomach and then vomited, or it may be into the bowel and passed as black tarry masses, or the umbilicus may be the source of the hæmorrhage. As a rule the umbilical hæmorrhage comes on the fifth to seventh days of life, while the stomach hæmorrhage comes on the second to fifth days. Other less common sites are the mouth, nose, ears, eyes, and under the skin particularly at pressure points, as sacrum and heels, and at the sites of pemphigus or other lesions of the skin. These hæmorrhages are simply oozings; there is no definite point or vessel that is bleeding. The fever that accompanies all these cases is not considered of much importance and probably is due to nutritional causes (Holt). As the total amount of blood in the body of a newborn baby is small, the effects of blood loss show quickly, namely, great weakness, inability to nurse, shriveling up of skin, very weak cry, and finally death. An ounce of hæmorrhage in an eight pound babe has the same relative effects as the loss of a quart of blood by an ordinary adult.

TREATMENT

The indications for treatment are three: first, hæmorrhage; second, anemia, and third, infection. Innumerable treatments have been proposed for these hæmorrhages but these treatments are all wanting in one way or another. The ideal treatment is direct transfusion to fill the baby's depleted vascular system full of rich red blood capable of clotting and capable of carrying oxygen and this at one time stops the hæmorrhage and permanently relieves the acute anemia, transforming the weak, anemic, dying child into a husky, struggling, rosy, hungry baby. The results of transfusion upon the newborn are so marked and so immediate that one can say it is just one degree removed from the miraculous (case 3). The adult plasma from the donor unquestionably contains a much larger amount of bactericidal substances than the plasma of the newborn, and hence enables the babe to overcome any infection that may be present much better than the anemic plasma of the newborn.

DONOR

The father is the most acceptable as donor, because physiologically he is the closest to the baby of any individual except the mother. The serums of mother and child are practically identical and theoretically she should be chosen as donor, but practically it is best not to disturb her as the father's blood acts sufficiently well. The amount of blood lost by the donor is very small. An eight pound baby normally has only six and two-fifths ounces of blood, according to Dr. Jacobi, the proportions being one-nineteenth of its body weight, while it is one-thirteenth in an adult. The necessary blood will flow out of the radial artery of the donor very quickly and cause no acute anemia. The child, however, should be watched carefully to guard against acute dilatation of the heart from a too rapid flow. When the blood enters the baby's vessels too rapidly it will cause an acute dilatation of the right heart, manifested clinically by cyanosis (cases 3 and 4), dyspnœa, præcordial pain, and cough. As to how small a baby it is possible to transfuse, I will say our case is the smallest that has yet been transfused, namely, four pounds, though experimentally I transfused a baby weighing one and one-half pounds, and my conclusion is that any ordinary babe is capable of operation.

CASE REPORTS

The first case operated upon is of such interest that I will quote it in full, the others I will only abstract and then report our own case.

CASE 1. Title of paper. Melena neonatorum; transfusion; recovery. Reported by Dr. Samuel W. Lambert, Dr. Alexis Carrel, and Dr. George E. Brewer, May 30, 1908, in Medical Record, vol. lxxiii, p. 885.

"The baby was born of healthy parents, and was delivered after a ten hour labor by an easy low forceps operation at 5 A. M. on March 4th. The child was a girl and appeared to be healthy, weighed 8 pounds and 12 ounces, breathed and cried at once, and showed no signs of asphyxia. The blades of the forceps made slight marks over the right zygoma and behind the left ear; there was no abrasion of the skin. Five hours after birth the cord was retied because of slight oozing from the cut end. Twelve hours after birth a thickened, dark colored spot

was noticed on the right side of the tongue, which was thought to be a nevus, but which has cleared up since and was undoubtedly a hematoma. Three hours later the baby's temperature was 102.2° F., and it was put to the breast for the first time. After a quiet night the baby's morning temperature was 102°. She looked pale, and a slight amount of blood was noticed when the mouth was washed. She slept quietly all that morning, but became restless in the afternoon, her temperature at 4 P. M. being 103.4°. She grew markedly paler, cried continuously, and began to bleed slowly but steadily from the nose, and a hematoma appeared in the scalp, behind the left ear. At 9 P. M. this subcutaneous bleeding had extended down the neck over the muscles, across the median line to the other ear, across the coronal suture over the frontal bone, and forward under the left ear to the angle of the jaw. The bleeding from the nose was continuous and quite profuse. The temperature was 102.3°, a dark meconium stool gave a very positive reaction for blood, but the urine was of normal color. The baby was of waxen pallor. The diagnosis of melena was made, and treatment instituted on the theory of its being an intestinal infection. One dose of thirty minims of castor oil was given, and 2-grain doses of calcium lactate every two hours during the night.

"During March 6th the child did not seem to grow worse so rapidly. The scalp hematoma increased in size, and tenseness and pallor of the skin increased, but the temperature gradually fell from the maximum of the attack at 2 P. M. (104.4°) until it reached 97.4° at 3 P. M., the nasal bleeding became less constant, and the baby nursed regularly. In the evening of March 6th and during March 7th there was some vomiting of watery fluid containing partially digested blood, especially after taking the calcium lactate. The calcium lactate was stopped. Adrenalin was tried in the nose at this time, but without effect. The feeding had to be done with a dropper, for the baby refused to nurse. The temperature range was 97.8° to 99.4°.

"On the morning of March 8th the case seemed hopeless. During this day the baby's skin was waxen white and the mucous membranes without color; the nasal bleeding was continuous; the vomited matter contained milk curds, dark blood, and at times bright clots; the stools were frequent and contained bright red blood; the subcutaneous hematoma on the scalp increased until the right eye was closed, and ecchymotic spots appeared on the legs; the respiration was rapid and superficial; the pulse weak; 150 to the minute just before the operative procedures.

"It was decided to attempt a direct transfusion of blood from the father of the infant by end to end anastomosis of two blood-vessels, after the manner devised by Dr. Carrel, of the Rockefeller Institute. This was done by Dr. Carrel and Dr. Brewer. The right popliteal vein of the baby was sutured to the left radial artery of the child's father without anæsthetic to either patient and enough blood was allowed to flow into the baby to change her skin from a pale transparent whiteness to a brilliant red color. No measure of the amount of blood was possible, but the evidences of a sufficient quantity were manifeld. She began to cry lustily and to struggle against the bandages which held her strapped to an ironing board. The wound in the leg up to this time had oozed a slight amount of pale watery blood which did not clot well. It began to bleed freely and the blood promptly clotted. The nosebleed stopped instantly. The pulse became full and strong and slowed down, and the respirations were deep and full. As soon as the wound was sutured and dressed the baby was fed an ounce of milk, which she took ravenously and retained and immediately went to sleep.

"Since the ending of the transfusion there has been no hæmorrhage, no vomiting, and no diarrhœa. Convalescence from the operation was uninterrupted except for a slight infection of the wound. There was no evidence of hemolytic action at any time, and all the symptoms of melena ceased at once. The next morning the baby was found to be 14 ounces below her birth weight. She has gained steadily since, and now, eight weeks after birth, she weighs 10 pounds and 15 ounces. The hematoma was absorbed rapidly except for a slight discoloration of the upper lid of the right eye, which still persists. The stools became of normal character two days after the operation. The wound is healed and the child appears to be a normal child of its age to-day. The striking thing in the case is that the disease ceased suddenly and that the child has been cured from the moment of the transfusion of the blood.

CASE 2. Title of paper. Transfusion as a cure for melena neonatorum.

Reported by Dr. Herman O. Mosenthal, New York.

Surgeons. Dr. Alexis Carrel, Dr. Adrain Lambert, and Dr. R. D. McClure.

When and where reported. May 14, 1910, J. A. M. A., vol. liv, p. 1613.

Family history. Negative, both parents are healthy.

Number of children. One (the patient).

The child. Male, normal labor.

Etiology. Not known, probably abnormal clotting quality of the blood.

Weight at time of operation. Five pounds and two ounces.

Treatment before operation. None.

Age when hæmorrhage began. Third day.

Source of hæmorrhage. Vomited blood once, hæmorrhagic spots on soft and hard palate, frequent hæmorrhage from the bowel.

Duration of hæmorrhage before operation. Eight hours.

Condition of patient before operation. Almost exsanguinated, marked pallor, pulse 180, weak.

Condition of patient during operation. The

color of the child changed within a few minutes after the blood began to flow from the father to child, from a waxy pallor to a marked blood red.

Condition of patient after operation. No further hæmorrhage; second bowel movement, normal in color; nursed well, gained weight rapidly, perfectly normal one year after operation.

Donor. Father. Effect on donor, none.

Anæsthetic. 1. Father, not reported. 2. Child, not reported.

Vessels used. 1. Father, radial artery. 2. Child, femoral vein.

Duration of transfusion. Not reported.

Complications. Small size of the patient, small caliber of the vein.

Ultimate results. Complete recovery.

CONCLUSIONS

1. Transfusion should be done whenever recourse may be had to the skilled surgeon necessary to perform this delicate operation.

2. All therapeutic measures tried in the treatment of melena neonatorum have been of little or no benefit.

3. If the future should show that transfusion does not cure every case of melena neonatorum, it might point to a multiple etiology for this disease.

CASE 3. Title of paper. A case of hæmorrhage disease in the newborn, with direct transfusion.

Reported by Dr. Harvard F. Swain, Dr. J. M. Jackson, and Dr. F. T. Murphy.

Surgeon. Dr. F. T. Murphy.

When and where reported. September 16, 1909, Boston Medical and Surgical Journal.

Family history. Paternal grandmother died of pernicious anemia; a cousin of the patient died of melena neonatorum on the fourth day after birth. The parents of the child are healthy.

Number of children. One.

Child. Apparently healthy at birth, sex not reported, breast fed.

Etiology. Not reported.

Kind of labor. Normal, primipara.

Weight at birth, seven pounds and two ounces.

Treatment before operation. Thirty-five hours after birth, 75 cc. of fresh rabbit's serum was injected subcutaneously; no improvement. A few hours later diphtheria antitoxin (amount not reported) was used; no improvement.

Age when hæmorrhage began. Thirty-three hours after birth.

Source of hæmorrhage. Large quantities of blood were vomited, some blood in bowel movements. Later, hæmorrhagic spots appeared in the skin.

Duration of hæmorrhage before operation. About twelve hours.

Condition of patient before operation. The baby was in extremis, no radial pulse, apex beat 180 per minute, respirations shallow and weak.

Condition of patient during operation. The pallor of the child gradually changed to a deep cyanosis, caused by a too rapid inflow of blood, which caused a dilatation of the right side of the heart, apex beat 50 per minute, cyanotic condition disappeared in about twenty minutes.

Condition of patient after operation. Complete cessation of the hæmorrhage, rapid convalescence.

Donor. Father. Effect on donor, not reported.

Anæsthetic. 1. Father, not reported. 2. Child, not reported.

Vessels used. 1. Father, radial artery. 2. Child, internal saphenous vein.

Duration of transfusion. Between five and six minutes.

Complications. The small size of the vein made it difficult to cuff back the walls of the vessel.

Ultimate results. Complete recovery.

CASE 4. Title of paper. The hæmorrhagic disease of the newborn, with special reference to blood coagulation and serum treatment.

Reported by Dr. Herman Schwarz, and Dr. Reuben Ottenberg, New York.

Surgeon. Dr. A. A. Berg.

When and where reported. July, 1910, The American Journal of Medical Sciences.

Family history. The father denies syphilis. Mother, fourth pregnancy. First was miscarriage at two months. Second was miscarriage at four months. Third is apparently healthy child. There are no bleeders in the family.

Number of children. Two living and two dead.

Child. Male, apparently healthy at birth, breast fed.

Etiology of the disease. Syphilis?

Kind of labor. Normal.

Weight at time of operation. Not reported.

Treatment before operation. Child was well until the seventh day, when it began to vomit after feeding. The vomitus was black. On the eleventh day an injection of 10 cc. of horse serum was given; this had no effect on the hæmorrhages or the coagulation time.

Age when hæmorrhage began. Seventh day.

Source of hæmorrhage. Nose, mouth, stomach, and bowels.

Duration of hæmorrhage before operation. Five days.

Condition of patient before operation. Temperature 99°, skin moderately icteric, hæmorrhage from nose, mouth, ecchymosis over the lumbar spine, blood in vomitus and stools. Red blood cells, 2,800,000, hemoglobin, 30 per cent, white blood cells, 27,600. Slight enlargement of all the lymph nodes.

Condition of patient during operation. All hæmorrhages stopped soon after the transfusion was begun. The color of the skin changed from a waxy pallor to a bright red, then extremely cyanotic, transfusion was then stopped.

Condition of patient after operation. Twelve hours later the general condition of the patient was good. Hemoglobin, 99 per cent; temperature, 99 per cent.

No hæmorrhages. Red cells, 7,860,000. White, 24,200. Polynuclear, 46 per cent. Mononuclear, 54 per cent. Considerable serum albumen in the urine.

Donor. Father. Effects on donor, none.

Anæsthetic used. 1. Father, not reported. 2. Child, not reported.

Vessels used. 1. Father, not reported. 2. Child, not reported.

Duration of transfusion. Twelve minutes.

Ultimate results. Death eight days after transfusion.

CONCLUSIONS

1. Impaired blood coagulation is the immediate cause of uncontrollable hæmorrhages in the newborn.
2. This is probably due to destruction of, or interference with, the production of thrombokinase.
3. Bacterial infection is the most frequent underlying cause of the disease; but
4. Syphilis alone can cause the disease without bacterial infection.
5. The value of serum injections is doubtful.
6. It is important that transfusion be tried when ordinary measures have failed.

CASE 5. Title of paper. A case of hæmorrhage of the newborn treated by direct transfusion. Reported by Dr. F. S. Mowell, Boston.

Surgeon. Dr. J. C. Hubbard.

When and where reported. September 15, 1910, Boston Medical and Surgical Journal.

Family history. Parents healthy.

Number of children. Two.

Child. Female, apparently healthy at birth, bottle baby.

Etiology. Not determined.

Kind of labor. Normal, no asphyxia.

Weight at birth. Seven pounds and six ounces.

Treatment before operation. None.

Age when hæmorrhage began. Second day.

Source of hæmorrhage. First vomited blood profusely, later found in the stools.

Duration of hæmorrhage before operation. Twenty hours.

Condition of patient before operation. Pale, pulse, 135, frequent hæmorrhages.

Condition of patient during operation. The color improved very rapidly, pulse was slower and better quality.

Condition of patient after operation. The general condition of the child much improved, next day temperature was 103°, pulse 120. The child seemed listless and weak but there was a steady improvement in the condition of the patient, and three days after the transfusion the temperature was normal. Nearly three weeks after the operation the patient was then at its birth weight, seven pounds and six ounces.

Donor. Father. Effect on donor, not reported.

Anæsthetic used. 1. Father, not reported. 2. Child, not reported.

Vessels used. 1. Father, radial artery. 2. Child, internal saphenous vein (left).

Duration of transfusion. Twenty-five minutes.

Complications. The small size of the vein, requiring two hours to make the anastomosis.

Ultimate results. Complete recovery.

CONCLUSIONS

The extreme difficulty of performing transfusion on a newborn baby, on account of the small size of the vessels, means that an expert should always have charge of the operation, if possible.

CASE 6. Surgeons. Dr. V. D. Lespinasse, and Dr. G. Carl Fisher.

Baby Codia, male, was born September 24th, at 7:50 A. M., with a midwife in attendance. His existence for the first week of life was marred by no untoward occurrences, but one week after his birth, on Sunday, October 2d, hæmorrhage began from the umbilical cord. Dr. Kalowsky was called, and he retied the cord with no success; then he inverted the stump of the cord drawing the skin of the abdomen over it in exactly the same manner as the stump of an appendix is buried. This technique was of no avail, as the blood continued to flow from around and between the stitches. The child was then put into the care of Dr. Bellows, and he ordered it to the Jane McAllister Hospital on Monday evening, October 3d. When it arrived there the nurses reported that its clothing was saturated with blood. The bleeding continued, and when I saw the child, Tuesday, October 4th, at 2:30 P. M., it was still bleeding from the sutures around the cord. It was a very small, greatly emaciated, thin, weak baby, weighing four pounds. Blood was oozing from the inverted cord and the pad over it was blood stained. There was marked icterus present, a few petechiæ under the skin, and pemphigus bullæ on the feet and legs. The cry was weak, more of a whine. There had been a slight hæmorrhage from the mouth, Tuesday morning. No nasal or rectal hæmorrhage had been noted. Transfusion was decided upon and was done immediately.

Family history. Father, an Austrian laborer, 35 years old, apparently well and strong. Mother, Austrian, 25 years old. This is her second child, the first being a seven month babe and died soon after birth. Mother has notched Hutchinson teeth. Has an almost continuous headache and a most irascible temper. Dr. Kalewsky thinks she is affected with hereditary syphilis.

Operation. The femoral vein of the baby was exposed below the origin of the profunda femoris vein. There was no anæsthetic used at all. In making this dissection a little very thin and very pale watery fluid flowed out but it had no coagulating power; it looked like water with a few drops of blood in it. The radial artery of the father was exposed at the wrist, using quinine and urea anæsthesia, and then the artery was joined to the babe's femoral vein. The clamps were removed and the blood allowed to flow from the father into the baby. Soon there could be noticed a flush coming over the baby's neck. This would advance, then retreat,

and then advance again, till finally the two areas met at the top of the skull. The skin and visible mucous membranes become redder and redder and when they were quite red the anastomosis was severed. Simultaneously the child began to show evidence of increased vigor. The cry became stronger and louder. The child struggled to free itself from the grasp of the nurse and Dr. Waterson who were holding it. Great care was necessary that its movements put no traction on the blood-vessel anastomosis. During the transfusion the wound on the baby's leg became filled with a hard black clot. The vein and artery were ligated after allowing the blood to flow seven minutes, and the wounds sewed up. About one-half hour after operation the mother came to the Hospital, and the babe nursed well but tired from the exertion. About fifteen minutes after the operation the operated leg was of a dark blue color due to stasis incident to the ligation of the femoral vein. This began to improve in an hour or so, and in two or three days the leg was normal.

Tuesday, October 4th, 6 P. M. Circulation in foot some better, babe strong, nursing. 9 P. M. Foot warm, circulation improving right along, color better, and babe's condition good. The P. M. temperature was 100.8°. Baby had a bowel movement at 8:20 P. M. No hæmorrhage since the operation. Wednesday the circulation in the leg continued to improve, no hæmorrhage, and the child was stronger. Wednesday evening the baby was taken home against our advice and urgings, but the mother insisted and unfortunately her wishes prevailed. The babe did fine up to October 10th, when it seemed to be weaker, and that evening it had a fresh outbreak of pemphigus. On October 12th the babe began to bleed from the left heel, this was followed by hæmorrhages from the sites of the pemphigus bullæ, from the mouth and nose, and numerous petechiæ appeared under the skin but no hæmorrhage from the cord. On October 13th the babe was brought back to the Hospital with the hæmorrhage still going on. I saw it and proposed another transfusion, but the mother said no. She would not even permit a photograph to be taken or allow the nurses to touch the baby. Baby died the evening of October 13th, nine days after transfusion, and three days after the recurrence of the hæmorrhage.

GENERAL COMMENT

Of the six cases of hæmorrhage of the newborn that have been transfused, an immediate cessation of the hæmorrhages has been noted in all. A marked immediate increase in bodily vigor has been noted in all, as shown by the vigor and lustiness of the cry, the ability to nurse, and the avidity with which the nipple was sought. The anemia has been relieved at once as shown by the color of the visible mucous membranes and the hemoglobin index. As regards etiology, case 4 was undoubtedly syphilitic and died eight days after operation; there was no recurrence of hæmorrhage but death resulted probably from effects of syphilis alone. The other cases, 1, 2, 3, and 5, were probably due to a hypoplasia of the blood or sepsis, which was overcome by the bactericidal properties of the donor's plasma. Our case (No. 6) had palpably a double etiology, namely, syphilis, and an infected cord, as the babe was born under very unhygienic surroundings. The immediate effect of the operation was excellent the same as in the other cases, but evidently the infection present in the child was too virulent to be overcome by the bactericidal elements of the father's blood, and so the child ultimately succumbed.

CONCLUSIONS

From the above described cases I think the following conclusions are justifiable:

1. Direct transfusion of blood is the ideal treatment for hæmorrhage of the newborn; it meets and overcomes in an ideal manner the three chief indications: hæmorrhage, anemia, and infection.

2. Transfusion checks the hæmorrhage at once.

3. Transfusion cures the acute anemia.

4. Direct transfusion of blood fills the baby's veins with a plasma that is more resistant to infections than the original plasma.

5. In the cases without syphilitic taint, direct transfusion of blood is an absolute specific.

6. Direct transfusion is best performed early, but it is never too late, and the operation should be tried in every case before the child dies (case 3).

SOME EXPERIMENTS ON THE RENAL ARTERY[1]

By V. D. LESPINASSE, M. D., G. CARL FISHER, M. D., and J. A. WOLFER, M. D., Chicago, Illinois

THESE experiments were undertaken with two objects in view: 1. The possibility of the kidney functionating after its nerve supply has been severed. 2. The applicability of the magnesium ring technique of blood-vessel anastomosis to the renal artery.

These experiments may be divided into three groups: 1. The dissection of the kidney free from all its attachments to the body except the artery, vein, and ureter. The object of this experiment was to determine if the kidney would continue to functionate sufficiently to support life. Three operations were performed in the following manner. Median abdominal incision, kidneys exposed and freed, then the pedicles were carefully dissected till nothing was left but the vein, artery, and ureter. These were carefully examined to be sure all the nerves were cut. One dog died of infection the third day after operation. The other two healed up and seemed to be in the best of health, but they became mangy and were killed six weeks after operation. The kidneys showed no changes except adhesions around them where they had been traumatized. I think these few experiments show that the kidney will functionate without its nerve supply. This has been confirmed by Dr. Carrel, who reports several replantations of the kidney in the Journal of Experimental Medicine for March, 1910.

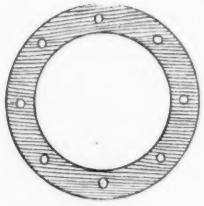


Fig. 1.

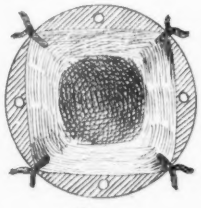


Fig. 2.

Fig. 1. The plain ring — one large central hole and eight small suture holes in the wall.

Fig. 2. Shows the ring slipped over the outside of one end of the vessel and then sewed to the vessel by four stitches, using every other hole. This is done on both ends of the vessel.

2. The next series of experiments were made in the following manner. One kidney was removed, then the pedicle of the opposite kidney was exposed and all the structures except the renal vein and the ureter were cut across. Care was taken to strip the vein and ureter very clean. The artery was then reunited and the abdominal incision closed. These dogs all died within 24 hours to four days after operation, except one which lived one month, but it finally succumbed to a chronic peritonitis. The autopsy showed a bloody peritoneal fluid and dense adhesions around the kidney. The artery was surrounded by these dense adhesions. When it was split open it was free from clots but showed a marked arteritis. The line of union cannot be seen. The magnesium was hardly absorbed at all, due probably to the sepsis. No gas was present in the tissues.

3. This group was a two stage operation, dissection of the kidney pedicle leaving only the vein and ureter, followed by an end to end anastomosis of the renal artery. Ten days later the opposite kidney was removed. In this series of cases all of the dogs lived. Hence we see if by any cause the renal artery is severed there is no need to remove the kidney; do an anastomosis on the renal artery and re-establish the blood stream.

TECHNIQUE OF THE BLOOD-VESSEL ANASTOMOSIS

The renal artery after being freed is clamped in two places and then cut across. An

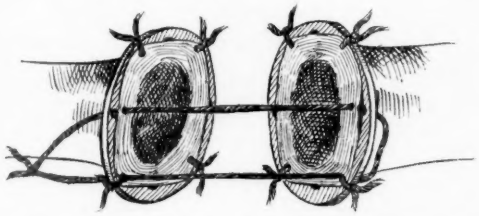


Fig. 3. The two rings being sewed together, one of the four mattress stitches passed; three more to be passed.

[1] Read before the American Urological Association, Ninth Annual Meeting, St. Louis, Missouri, June 6 and 7, 1910.

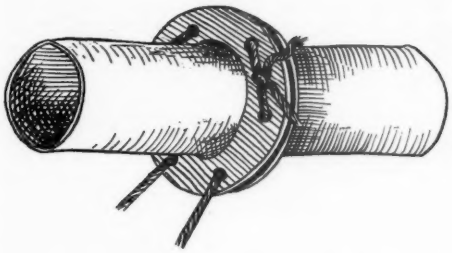


Fig. 4. Shows the mattress sutures drawn up and all of them tied but the last one.

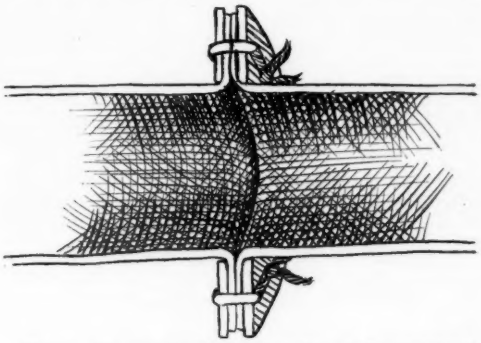


Fig. 5. Shows a longitudinal section of the completed operation and shows very clearly how every portion of the ring and suture is outside of the vessel and does not come in contact with the blood stream

appropriate sized ring is then slipped on each end of the artery and sewed in place by four sutures of triple o silk. Then the two rings are joined together by silk sutures using four mattress stitches of B silk. All these sutures are heavily coated with vaseline not as in the suture methods with the idea of preventing thrombosis, but simply to facilitate their slipping through the tissues. After they are all placed and ready to be drawn up, the vessel ends are carefully washed out and then the sutures are drawn up and tied. Draw them just tight enough to bring the edges in firm apposition, not tight enough to cut the intima. Remove the clamps, the distal one first, and sew the sheaths of the vessel and peritoneum back over it and the operation is finished.

CONCLUSIONS

1. The technique of the author's magnesium ring blood-vessel anastomosis is practicable for work on the renal artery.

2. It is well within the skill of the average surgeon.

3. Its results are good. No stricture, no dilatation of the blood-vessel.

4. Thrombosis occurs very seldom. Nine operations, one thrombosis, a percentage of 11 per cent.

5. In applying it to the renal artery the chief difficulty is the depth and inaccessibility of the vessel and its short length, necessitating a long incision.

6. The kidney will functionate even if its nerve supply is entirely severed.

FOUR ESSENTIALS IN THE TREATMENT OF PAINFUL FEET[1]

By JOHN L. PORTER, M. D., Chicago, Illinois

SINCE my previous contributions on the subject of painful affections of the feet[2] I have been further impressed with the importance of four steps in the successful treatment of these conditions.

These are rest, supination, support, and exercise. In addition to these, operation may be necessary, as in cases with exostoses or contracted tendons, but whatever be the condition under treatment, if the predominating symptom is pain, the first four procedures are essential. It is perhaps worth while to discuss them in detail.

Rest. When a patient presents himself complaining of pain in his feet, after making a diagnosis I ask him if he has tried giving

[2] Lancet-Clinic, Cincinnati, April 4, 1908; Clinical Medicine, Chicago, August, 1910.

[1] Read before the Chicago Orthopedic Society, November 14, 1910.

them rest. Almost invariably I find that he has kept at work for months after the trouble began. Sometimes he has been obliged to stay at home for a few days, but was about the house more or less, usually in old, soft shoes during that time. Frequently a patient states that his feet are better on Mondays after having rested up over Sunday. In other words, while the patient himself has noticed that rest, though incomplete, is of marked benefit, he has never followed out the suggestion logically and given his feet prolonged and absolute rest. I frequently see cases of gonorrhœal arthritis and periostitis, with spurs on the bottom of the os calcis and feet swollen and exquisitely painful, hobbling about with a cane or two canes, trying to keep at their occupation, when they readily admit that they are free from pain when the feet are at rest.

It is necessary to impress upon the patient that rest means absolute and prolonged relief from weight-bearing, and that if he steps on his feet even once a day, he thereby forfeits all the benefit secured by twenty-four hours in bed. The reason for that is that when the painful, relaxed, inflamed tissues composing the supporting structure of the arches of the foot are once stretched out by superimposed weight, it takes at least 24 hours for them to regain tonicity and contractile power to counteract the traumatism. I have found it so difficult to impress upon the patient, that sitting around the house in slippers is not rest, in the full sense of the word, that I have adopted the plan of fixing the feet in plaster of Paris or some dressing that prevents the patient's stepping. The duration of absolute rest necessary will depend upon the amount of pain and tenderness and the degree of pronation and relaxation. It varies from a week to a month, and can only be learned by experience with all sorts of cases.

Supination. If we study the dissected foot we notice at once that the pronated position puts all the tissues supporting the longitudinal and transverse arches on the stretch, while supination relaxes the plantar structures, and allows the tibial and flexor muscles which are chiefly concerned in lifting the weight from the inside toward the outside of the foot, to contract. In studying the action of the normal untrammeled foot of an aborigine, we notice first that the toes point toward the line of progression,— he toes in a little, and the weight is transmitted from the os calcis outward and forward to the middle of the toes, and the step is finished by the toes grasping the ground almost simultaneously.

As the calf muscles contract through the tendon Achilles and throw the weight forward, the tibials and long plantar muscles acting at the same time, tip the weight outward toward the outer border of the foot and onto the toes. Active supination then is a natural part of a normal step. Any attempt to exercise the muscles of locomotion with the foot in the pronated position is not only awkward but soon becomes painful. Conversely, when the foot has become pronated and painful by some disturbance of its mechanism, the only position in which the weak and overstretched tissues supporting the structure can regain their tonicity and power and undergo contraction is in supination. No matter what the degree of distortion nor whether it is static, traumatic, or inflammatory in origin, if it is pronated it can never be cured or relieved of pain until it is supinated.

Support. After the weak or pronated foot has been supinated it needs support. The character of the support and how long it will be needed, depends upon the strength of the supporting structures and the amount of traumatism that has been required to supinate the foot. I find that when the great majority of practitioners are confronted by weak or painful feet or "broken arches," they think of foot plates or "arch supports." That is a great mistake, for a very large percentage of such cases do not *need* them, and another large percentage could not wear them if they *had* them. The earlier and milder cases, whether static, toxæmic, or inflammatory in origin, can be better treated without them, and the most severe cases, with rigidly pronated feet, cannot wear them. That leaves only the cases of moderate degree, and the severe cases in which supination has been secured by force, in which they are useful.

It is my custom to first supinate all cases of painful feet of whatever character, using any means necessary, including tenotomies, osteotomies, excisions, or osteoclasis, to get the foot into a supinated position. Then I enclose the foot in a comfortable plaster cast until the plantar tissues and supinator muscles have had a chance to contract and all tenderness and pain have disappeared. In cases of simple weak foot, seven to ten days' rest with the foot held in supination will be all that is necessary, as preliminary preparation for support, while in severe, rigid cases requiring tenotomy, excision of the peroneals, or scaphoidectomy, the foot may be kept in plaster cast for two months.

Then comes the question of support. If it is a simple weak foot, a stout, straight-lasted shoe with triangular heel to help keep up the supination may be all that is necessary. More severe cases will need shoes made to order with wide shanks and stiff insteps plus the triangular heel. In more severe cases I make a plaster model of the corrected foot and over that make a foot plate of light German silver, adapting the shape of the plate to the particular needs of the case in hand. Some need three flanges, some one, and some none. I use German silver for practically all plates, because they can be easily reshaped as the foot improves, and they will not break as easily as bronze, brass, or aluminum.

I find myself using foot plates less each year. Perhaps we may find a means of supporting even the bad cases without them. The very severe cases, after correction, not only need to have special shoes and special soles, made thicker on the inside, and special foot plates, but special care for a long time before they should be allowed to walk very much. The feet should be rested in the special shoes, with the foot plates to maintain supination, a larger part of each day. Then massage and hydrotherapy to improve the circulation are useful, and gradually the patient is encouraged to lengthen his walks until finally he can get about all day with comfort.

Exercise. In all except the most rigid cases and in elderly patients, exercises to strengthen the flexor muscles of the leg and foot are necessary to complete the cure and enable the patient eventually to discard the artificial supports. Patients past 50 years of age, and rigid cases which have required operation, generally have to use supports of some sort continuously, though many of these improve sufficiently so that the support may be incorporated in a shoe that is made to order. The first exercise required of all patients is walking with the toes turned in. The triangular heels and lift under the inner edge of the sole compels them to do this at first, but the necessity of cultivating that gait is impressed upon patients and they are required to practise it fifteen minutes morning and night in stocking feet or moccasins, until finally they do it unconsciously, and the lift on the sole can be abandoned.

Another exercise that brings into play all the supinator and flexor muscles is rising on the toes and at the same time turning the toes inward. This is repeated fifty times night and morning and during the day as often as the patient will do it. Then the patient is directed to give the feet a cold bath, followed by brisk rubbing, and with one leg crossed over the other to successively plantarflex, supinate, and extend the foot as strongly as possible fifty times. In a young patient with active muscles, and in milder cases, these measures, if thoroughly carried out, will complete a cure in six to twelve months. In cases due to infection, as for instance in gonorrhœal feet, the primary infection must, of course, be cured.

ACUTE FREE SUPPURATIVE PERITONITIS

By JASPER HALPENNY, M. A., M. D., C. M.,
Surgeon to the Winnipeg General Hospital; Lecturer in Clinical Surgery, Manitoba Medical College
AND
JAMES GORRELL, B. A., M. D., C. M.
Formerly Senior Resident Surgeon in the Winnipeg General Hospital

IN the various articles on peritonitis which have appeared during the last three or four years there has been much discussion over the question of classification. There is a great difference in the minds of various writers as to what constitutes general peritonitis. If a case, to come into this class, must have pus in all parts of the abdomen, including the lesser sac of the peritoneum, there are probably few cases ever reach the class. Most cases either recover or succumb before the septic fluid is present in every region. In our series we cannot claim that we know of more than one case of this nature. This was a man of some 40 years of age, so prostrated with the very evident peritonitis that he could not give any history at the time we first saw him. From the account of former illness given by his physician it was thought that a perforated duodenal ulcer was the most probable cause of the peritonitis and an incision was made accordingly. Through this incision we were able to demonstrate pus *everywhere* in the upper abdomen. The cause of the trouble was located in the appendix, and a second incision to remove it demonstrated pus in the lower half of the abdomen. In all other cases all that we can say is that pus was free and unconfined and was present in all the operative field. More than this we cannot say, for we did not explore beyond what was absolutely necessary to repair the causative lesion except to insert a drainage tube into the pelvis in all cases. Here pus was always present under considerably greater tension than in the operative field. From a practical standpoint it would appear to be bad treatment to explore beyond what is absolutely necessary, for manipulations, even though pus is already present, can do naught but harm by causing abrasions of the peritoneum and increased absorption. We believe also that pus, free and unconfined, over any considerable area of the abdominal cavity will, in the vast majority of cases, continue to spread either till the whole cavity is involved or the patient is dead, for surely if nature is able to wall off pus over a considerable area it would have done so early in the process when the area involved was small. Therefore, from any but the scientific standpoint we are inclined to the view that the important feature in diagnosis is pus, free and unconfined, and involving a considerable area.

In the discussion of these cases it would not be necessary to emphasize the need for excluding those cases where the septic material is confined by limiting adhesions, except for the fact that considerable confusion exists on this point. Kennedy (1) seems clearly to include some such cases amongst those classified as general peritonitis.

Since September, 1907, there has occurred in the service of one of us (J. H.) twenty-six cases of acute free suppurative peritonitis, including both private and public patients. All were operated on as soon as seen. Three cases seemed perfectly hopeless but one of these lived, thus justifying our contention that every case should be given the benefit of operation even though statistics may suffer. The surgeon should treat each case on its merits and not treat statistics.

There were four cases of typhoid perforation, with one recovery; four cases due to ruptured pus tubes, all recovered; one perforated duodenal ulcer which recovered; sixteen cases of appendicitis with fourteen recoveries; and one case with a ruptured mass of tubercular glands with secondary infection, which recovered. Of the three typhoid perforations which died, two had occurred probably thirty-six hours before operation. The third one had occurred about five hours before being operated on. In this case about

four days after operation paralytic ileus occurred and an enterotomy was done to relieve it. The technique was faulty, for, though a tube was passed some twelve inches into the bowel to carry off the content, leakage occurred about the fourth day and death resulted from this second flooding of the peritoneum. Of the fatal appendical cases, one was in a girl thirteen years of age who evidently had pus in her abdomen at least four days before the parents called a physician. She was operated on within three hours of the time she reached the hospital. She died on the fifth day after operation. The second fatal case was a boy aged six years who had been ill a week, evidently with pus free in the abdominal cavity from the time the appendix ruptured, which probably occurred about the second day of his illness. In a third case which recovered, the physician who sent the child to the hospital was of the opinion that pus had been present two or three days before he saw the case, and the parents would not consent to its removal to the hospital for two days longer. In less than two hours after reaching the hospital it was operated on. On the fifth day afterward, fluid began to collect rapidly in the chest, which on examination showed streptococcus albus. Both sides of the chest were drained at once and the child made a slow recovery. The last case mentioned in the list was to us an unusual one. A young man, a printer by trade, was suddenly seized with agonizing abdominal pain. He was in such great distress he could not tell his own name. Before seen by us he had been given morphine gr. one-half, which had so far relieved the pain that he could lie fairly quiet in bed. We could not make a differential diagnosis, but there was no possible doubt about his having a free peritonitis of a somewhat virulent type. Two and a half hours after the pain set in he was operated on. There was a large mass of tubercular glands, with secondary infection, located in the mesentery of the small intestine. This had ruptured. The removal of the mass would have necessitated resection of at least eight feet of bowel. As much of the mass as could be got away, without damage to the mesenteric vessels, was removed. A drain was placed down to the mass and another through a second incision to the pelvis. Here, as usual, large quantities of pus were present under considerable tension. The man made a very good recovery.

With regard to operation and after treatment, Murphy's (2) methods were followed. The operation was done with the head elevated. No irrigation or wiping out was done. Saline was given continuously by the bowel. This is preferably done, not by the drop method, but by having a free unobstructed flow with the fluid container elevated from four to twelve inches. Where there is much pain following operation we believe in the administration of morphine.

The somewhat high death rate is to be regretted but as usual is capable of some explanation. In two of the cases of typhoid perforation, the rupture had occurred probably thirty-six hours before operation. This is too long a time to allow to pass in these cases. The two deaths in appendical cases were, we think, entirely due to the stupid and inhuman parents allowing their children to be sick, one six and the other seven days, with a clear history of pus in the abdomen for four and five days respectively. Possibly it was bad surgical judgment to accept these risks. The third death in typhoid perforation was no doubt due to faulty technique and should not have occurred.

The drainage used consisted in most cases of a single rubber tube passed through the operative wound into the deepest part of the pelvis. In no case was a second incision made for purposes of drainage. We prefer not to use glass tubes for fear of causing pressure necrosis. Gauze wicks of various kinds do not seem to us to be a good means of getting rid of large quantities of pus. Gauze should probably be reserved for packing wounds where the surface healing is too rapid for the deeper structures.

The opponents of drainage say that drains fail to drain; that the tube or other drain soon becomes walled off and thus does nothing toward emptying the general abdominal cavity. One is quite free to admit that adhesions occur round about a tube closing it off from the general cavity. We think,

however, that so long as any considerable amount of fluid is present in the abdomen, these adhesions occur only in the operative field, that is amongst the coils of bowel handled during the operation. That part of the tube beyond the operative field is probably not walled off for some twenty-four to thirty-six or forty-eight hours, depending on the amount of fluid present. We think postmortem observations will bear this. A gauze drain would undoubtedly be more likely to cease to fulfil its functions earlier than would a rubber one, owing to the greater tendency of the former to cause adhesions.

Regarding washing out of the abdomen at the time of operation, there are few writers advocate this at the present time. Ross (3) and Torek (4), however, still adhere to this treatment and both close the abdomen without drainage. As a reason for doing this, the former states: "The chances of any subsequent infection should be removed by the complete closure of the abdominal cavity." This probably does not appeal to many as sound surgical doctrine. One would expect that many wounds would fail to unite under these conditions and this is what happens apparently, for he adds, "In some cases the wounds healed, in others they broke down either throughout their whole extent or in part, owing to the virulence of the infection." This opening of the wound probably contributed to the successful issue of the severe cases, allowing, as it would, a certain amount of drainage. Many men, however, still prefer to irrigate when gross foreign material other than pus is present, for instance, particles of food and feces. Amongst the advocates of this treatment are Bond (5), Bingham (6), Blake (7), and others.

Our observation leads us to believe that some mechanical or physiological forces are at work whereby infected fluids in the belly more easily collect in the lower abdomen than in the upper, and chiefly in the pelvis. This was apparently the conclusion Yates (8) arrived at in his experimental work. He says: "It is noteworthy that the excess of free fluid was never confined to any single portion of the abdomen, but only increased in the most dependent part. In the head up position the great excess was in and just above the pelvis. This was also true in the horizontal position, though with relatively more fluid in the flanks. In the head down position, though the great excess was in the belly, there was relatively more in the pelvis than there was high up when the positions were reversed." In many of the cases in this series, as soon as a drainage tube was inserted into the pelvis large quantities of pus flowed out the end of the tube, though it might be an inch or two above the abdominal wall, while very little pus would trickle out through the incision itself.

As to what constitutes the benefit derived from the administration of large quantities of saline solution by rectum, subcutaneously or intravenously there are various explanations given. One of the most popular conceptions on this point is voiced by Johnston (9), who says it "largely increases the amount of urine passed, eliminating through this channel the septic material which has gained entrance to the circulation."

A similar view is held by Rose and Carliss (10) who say: "Recently it has been proposed to deal with the acute toxæmia of peritonitis and similar conditions by the repeated injection into the veins of large quantities of saline solution (a drachm to the pint) and excellent results have been obtained by this means, the injections being followed by diuresis and diarrhœa, which presumably assist in the elimination of the poison." We are not aware of the view that diarrhœa ensues on this line of treatment, but it is of course known to all that diuresis is marked in proportion to the amount of saline solution absorbed.

To ascertain in the first place what increase takes place in the amount of urine voided by these patients, we had a record kept of the urine in two other classes of cases, as well as in those having acute, free, suppurative peritonitis. In twenty-five patients who were confined to bed for some non-operative surgical affections such as fractures, etc., the average amount voided was thirty-five ounces, per twenty-four hours. The second series consisted of fifty unselected cases, mostly laparotomies, occurring in both public and private

wards, and under various surgeons. The series included:

Simple appendectomy	21
Appendical abscess	4
Ovariotomy	6
Inguinal hernia	8
Ventral hernia	2
Exploratory laparotomy	2
Cholelithiasis	3
Floating kidney	1
Hysterectomy	2
Salpingectomy	1

The record commenced immediately after the operation with the bladder empty. The average amount voided was as follows:

First day	20 ounces
Second day	22 ounces
Third day	26 ounces
Fourth day	32 ounces
Fifth day	31 ounces

It will thus be seen that it is not until the sixth or seventh day, in major abdominal cases, that the urine reaches the amount normal for patients lying in bed.

For our series of cases with peritonitis, all of whom had normal salt solution given continuously by bowel, the average amount of urine voided was:

First day	51 ounces
Second day	47½ ounces
Third day	45 ounces
Fourth day	44½ ounces
Fifth day	43½ ounces

The largest amount voided was 120 ounces in each of the first and second twenty-four hours. This was an adult male who took the saline exceptionally well. One child aged 9 years voided 69 ounces the first twenty-four hours and an average of 48 ounces for seven days.

These patients usually absorb very large quantities of fluid during the first thirty-six hours, by which time they show by the fuller face and other signs that they are well saturated. From this time on they cannot absorb as large amounts, usually not taking it continuously.

In order, if possible, to ascertain if toxic substances are excreted by the kidneys we had the urine, voided the second day following operation, sterilized[1] in sealed tubes at 60 degrees centigrade for one hour. Injections were made intraperitoneally into white rats in varying proportions up to two per cent of the body weight, without toxic effects.

We are aware that this does not prove conclusively that toxins are not thus eliminated, for even their very nature, whether proteid or otherwise, is still unknown, and we will be glad to know of any evidence on any of these points. It would seem, however, that the assumption that the benefit in the class of cases under consideration, is due to the excretion of toxins by the kidneys, is probably not correct. Moreover it would appear that the benefit to the patient would be very small indeed if by any means large quantities of toxic substances were made to circulate in the blood and ultimately to be excreted in the urine. These toxins would surely do much harm to the nervous and other systems and finally cause considerable irritation to the kidneys, thus giving rise to more or less acute nephritis, with some suppression of urine. Furthermore, if this view were the correct one, the use of diuretics would be indicated, and we are not aware that any one has suggested this either in conjunction with or as an alternative for the use of saline solution.

As a probable explanation, we suggested that the benefit arises because of the very marked dilution of the toxins, thus rendering them much more easily neutralized by the system; and secondly, acting as a stimulant, enabling the system to the better carrying on of the warfare against the toxæmia.

In the case from which the urine was used to test its toxicity, an analysis showed one or two points worthy of consideration.

	First Day	Second Day	Third Day	Fourth Day
Amount	37	31	45	39
Color	Amber	Amber	Amber	Amber
Reaction	Ac.	Ac.	Ac.	Ac.
Sp. gr.	1033	1033	1026	1026
Urea percentage	2.7	4	4	4.6
Urea amount in gms.	29.9	37.2	54	53.8
Indican	Trace	Trace	Abundant	None
Deposit	None	None	Few hyaline casts and few red blood cells.	None

Considering the diet of the patient, which was only sparing amounts of water the first

[1] This work was very kindly done for us by Dr. S. J. S. Peirce, Resident Pathologist of the Winnipeg General Hospital.

twenty-four hours, and broths and milk soups the following three days, this amount of urea was clearly quite large. Whether the increased output of urea is due to an extensive destruction of toxins, cannot be more than a conjecture at this stage. It would, however, seem worthy of consideration. We believe that the benefit to the patient of the absorption of these large quantities of saline solution, and the ultimate disposal of the toxins by the system have not yet been explained. These observations are submitted because they seem at least to be relevant, though enough work has not yet been done to justify any settled opinion. We hope to make further observations on the urea output in various types of cases, including patients not having peritonitis who have nevertheless had saline solution by the bowel, and thus ascertain if the cases in hand differ materially from others.

It cannot be too strongly urged that operation should be undertaken at once, in all cases of rupture of any part of the intestinal tract, whether duodenal or gastric ulcer, typhoid perforation, gangrenous appendix, or other less frequent lesion, or in any case of sudden flooding of the abdomen with large quantities of pus. Particularly in cases of typhoid perforation it is frequently said that the patient should first be allowed to recover from the shock. We are inclined to the belief that shock would be lessened by immediate administration of the anæsthetic, thus stopping pain and inhibiting absorption of toxins from the abdomen, both of which are large factors in causing shock. True, some cases have a fall in temperature immediately following the flooding of the abdomen, with a subsequent rise showing a reaction. It is doubtful, however, if cases operated on at this time are shocked to such an extent that death ensues on account of the additional insult to the system due to the operation. From the records of this hospital we know of no cases dying of shock during the first twenty-four hours after surgical repair of such lesions when the case was operated on at the earliest possible moment. Those cases of generalized infection of the abdomen dying after operation performed immediately, always lived for some days and ultimately succumbed to the toxæmia. On the other hand, a few cases operated on at a much later time, some from 50 to 100 hours after the infection occurred, died of shock.

REFERENCES

1. J. W. Kennedy. Diffuse and General Peritonitis. Surg., Gynec. and Obst., vol. x, No. 3, March, 1910.
2. John B. Murphy. Perforative Peritonitis; General, Free, Suppurative. Surg., Gynec. and Obst., June, 1908, pp. 565 to 598.
3. James F. W. Ross. The Treatment of Acute Septic Peritonitis. Am. Jour. of Obst., vol. lviii, No. 3, p. 404.
4. Franz Torek. Med. Rec., vol. lxx, 1906, p. 849.
5. Bond. British Med. Jour., Dec. 15, 1906.
6. George A. Bingham. Acute Septic Peritonitis. The Saskatchewan Med. Jour. (Regina), vol. i, No. 1, p. 1.
7. Joseph A. Blake. Amer. Jour. Med. Sciences, vol. cxxxiii, p. 454.
8. John L. Yates. An Experimental Study of Intraperitoneal Diffusion. Surg., Gynec. and Obst., vol. vii, No. 5, p. 495.
9. Robert W. Johnston. The Treatment of General Suppurative Peritonitis. Maryland Med. Jour., Feb., 1908.
10. Rose and Carliss. A Manual of Surgery, 6th edition, p. 78.

ADDITIONAL BIBLIOGRAPHY

1907 to date

(Supplied by Thomas Nelson and Sons)

Acute General Peritonitis from Perforation of Carcinoma Coli. Hospital, vol. xlii, p. 634 (1907).

Archibald, E. and Cummings, A. General Peritonitis. Coli. Hospital, vol. xlii, p. 634 (1907).

Archibald, E. and Cummings, A. General Peritonitis. Montreal Med. Jour., vol. xxxvi, p. 619 (1907).

Ball, W. G. Notes on Six Cases of General Peritonitis. St. Barth. Hosp. Report, vol. xliii, p. 155 (1908).

Barling, S. Treatment of General Peritonitis. Birmingham Med. Rev., vol. lxv, p. 191 (1909).

Barnhill, J. U. Diffuse Suppurative Peritonitis. Ohio Med. Jour., vol. iv, p. 325 (1908).

Beecher, C. E. Acute General Peritonitis. Illinois Med. Jour., vol. xvii, p. 179 (1910).

Bishop, E. S. Acute Peritonitis. Practitioner, vol. lxxxiii, p. 645 (1909).

Bogdanik, J. Ueber die Bauchfellentzündung. Wien. Med. Presse, vol. xlviii, pp. 1801, 1847 (1907).

Boldt, H. J. Peritonitis. Contributions Scientific, Med. and Surg., 25th Anniversary. New York Post Grad. Med. School and Hosp., p. 130 (1908) (The Roosa. Memorial).

Bornhaupt, L. Die Behandlung der allgemeinen eitrigen Peritonitis. St. Petersb. Med. Wochenschr., vol. xxxv, p. 45 (1910).

Bowers, C. E. Discussion on Diffused Septic Peritonitis. Jour. Kansas Med. Soc., vol. viii, p. 109 (1908).

Bué, V. Péritonite généralisée consécutive à la Rupture d'un Pyosalpinx après Avortement. Rev. mens. d. Gynéc. d'Obstet., et d. Pédiat., vol. iii, p. 374 (1908).

Burch, L. Treatment of Diffuse Peritonitis. South Pract., vol. xxix, p. 247 (1907).

CARLING, R. R. The Peritoneum and Peritonitis. Med. Press and Circ., new ser., vol. lxxxviii, pp. 605, 628 (1909).

CARSON, H. W. Treatment of Peritonitis. Medical Press and Circular, vol. cxxxiv, p. 175 (1907).

CARWARDINE, T. Clinical Lecture on Acute Generalizing Peritonitis and its Treatment. Brit. Med. Jour., vol. ii, for 1907, p. 1565.

CHANDLER, G. Treatment of Acute General Peritonitis. New York Med. Jour., vol. lxxxvi, p. 122 (1907).

CHANTEMASSE AND KAHN. La Prophylaxie et le Traitment de l'Infection Péritonéale a l'Aide de l'Hyperleucocytose provoquée par le Nucléinate de Soude. Bull. Acad. d. Méd., 3d ser., vol. lvii, p. 736; also in Rev. d. Thérap. Méd. Chir., vol. lxxiv, p. 438 (1907).

CHURCHILL, D. Report of Three Cases of General Purulent Peritonitis. Providence Med. Jour., vol. x, p. 52 (1909).

DAVIS, B. B. Diffuse Septic Peritonitis. Surg., Gynec. and Obst., vol. x, p. 316 (1910).

DAVISON, C. The Sequelæ of Acute Diffuse Suppurative Peritonitis. Ill. Med. Jour., vol. xv, p. 524 (1909).

DAYOT, *fils*. Traitment des Peritonitis généralisées. Ann d. Chir. et d'Orthop., vol. xxii, pp. 242, 263 (1909); also in Pédiatric Prat., vol. vii, p. 379 (1909).

DOUGLAS, R. Treatment of Acute Diffuse Peritonitis. Med. Record, vol. lxxi, p. 302 (1907).

EISENDRATH, D. N. Apparatus for Continuous Saline Enemas in Peritonitis. Jour. Amer. Med. Assoc., vol. li, p. 406 (1908).

EISENDRATH, D. N. Treatment of General Peritonitis Complicating Appendicitis. Amer. Jour. Surg., vol. xxii, p. 353 (1908).

FAGGE, C. Pathology, Diagnosis and Treatment of Perforative Peritonitis. Guy's Hospital Gazette, vol. xxiii, p. 71 (1909).

FEDERMANN. Ueber die Beurteilung und Behandlung der akuten Peritonitis. Berl. klin. Wochenschr., vol xlv, p. 1312 (1908).

FOWLER, R. S. Diffuse Septic Peritonitis due to Appendicitis. Ann. Surg., vol. xlviii, p. 828 (1908).

FOWLER, R. S. Treatment of Diffuse Septic Peritonitis following Appendicitis. New York State Jour. Med., vol. vii, p. 401 (1907).

FOWLER, R. S. Treatment of Diffuse Septic Peritonitis from Appendicitis in the first twenty-four hours. Surg., Gynec. and Obst., vol. ix, p. 586 (1909).

GERSTER, A. G. Treatment of Diffuse Progressive Free Peritonitis. Ann. Surg., vol. li, p. 490 (1910).

GILLIAM, D. T. Adjustable Canvas Chair as an Aid to the Murphy Treatment of Diffuse Suppurative Peritonitis. Jour. Amer. Med. Assoc., vol. li, p. 1133 (1908).

GRAEFE, C. Peritonitis. Cleveland Med. Jour., vol. viii, p. 22 (1909).

GRAEFE, C. When to Operate in Peritonitis. Internat. Jour. Surg., vol. xxi, p. 145 (1908).

GRAFF, H., MATTHES, M., AND SELLHEIM, H. Die akute allgemeine peritonitis. Berliner klinik, vol. xix (1907).

GRIFFIN, G. The Fowler Position in the Treatment of Peritonitis. New York Med. Jour., vol. xc, p. 902 (1909).

GULEKE, N. Zur Frage der Behandlung diffuser Peritonitiden. Verhandl. d. Gesellsch. deutsch. Naturf. u. Aerzte, 1909, part 2, vol. ii, p. 152.

HANSON. W. G. Diffuse Peritonitis Treated by Vaccines. New Eng. Gaz., vol. xliv, p. 22 (1909).

HEINEKE, H. Ueber den Werth der intravenosen Adrenalin Kochsalzinfusionen bei der Behandlung der Peritonitis. Verhandl. d. deutsch Gesellsch. f. Chir., vol. xxxviii, part 2, p. 298 (1909); also in Archiv. f. klin. Chir. vol. xc, p. 102 (1909).

HERTZLER, A. E. Present Status of Treatment of Diffuse Peritonitis. Archives Internat. Med., vol. v, p. 246 (1910).

HERTZLER, A. E. A Scientific Inquiry into the Present Treatment of Peritonitis. Surg., Gynec. and Obst., vol x, p. 317 (1910).

HINES, H. H. Case of Widespread Peritoneal Infection Treated Successfully by the Fowler-Murphy Method. Lancet-Clinic, vol. ciii, p. 72 (1910).

HIRSCHEL, G. Die Behandlung der diffusen eitrigen Peritonitis mit 1 proz. Kampferöl. Münch. Med. Wochenschr., vol. lvii, p. 779 (1910).

HOEHNE, O. Zur Prophylaxie der post-operativen peritonitis. Münch. Med. Wochenschr., vol. lvi, p. 2508 (1909).

HOLCOMB, O. W. Treatment of Acute Diffuse Peritonitis following Appendicitis. St. Paul Med. Jour., vol. x, p. 255 (1908).

ISAACS, A. E. Free Suppurative Peritonitis. Med. Record, vol. lxxv, p. 306 (1909).

KINSEY, F. C. Modern Treatment of Diffuse Suppurative Peritonitis. Jour. Mich. Med. Soc., vol. viii, p. 314 (1909).

KOTHE, R. Zur Behandlung der diffusen fortschreitenden Peritonitis mittels permanenter rektaler Kochsalzinfusionen. Therap. d. Gegenwart., vol. xlviii, p. 448 (1907).

KOTZENBERG AND MUCH. Zur Therapie und Bakteriologie der eitrigen Perforations peritonitis. Deutsch. med. Wochenschr., vol. xxxv, p. 201 (1909).

KROGIUS, A. Ueber die chirurgische Behandlung der diffusen eitrigen Peritonitis. Samml. klin. Vorträge (1907).

LA FORCE, W. B. Principles of the Treatment of Peritonitis based on Physiologic and Pathologic Conditions. Iowa Med. Jour., vol. xv, p. 182 (1908).

LANPHEAR, E. Post-Operative Peritonitis. Amer. Jour. Clin. Med., vol. xiv, p. 1229 (1907).

LEIGH, S. Treatment of Diffuse Suppurative Peritonitis. Virginia Med. Semi-Monthly, vol. xii, p. 461 (1908).

LICHTENBERG, A. Lässt sich für die Anwendung der intravenosen Kochsalzinfusionen bei der Peritonitis eine bestimmte Indikationsstellung ergünden? Münch. med. Wochenschr., vol. lvi, p. 2464 (1909).

LICHTENBERG, A. VON. Ueber die Kreislaufstörung bei der Peritonitis und über die Kochsalz-Suprarenin-Therapie. Wiesbaden (1909).

LUNDHOLM, E. M. Rational Treatment of Septic Peritonitis. St. Paul Med. Jour., vol. ix, p. 291 (1907); also in Internat. Jour. Surg., vol. xx, p. 302 (1907).

MCDANIEL, E. F. Diffuse Septic Peritonitis. Northwest Med., vol. vii, p. 81 (1909).

MCDONALD, E. Diffuse Peritonitis in Women. Surg., Gyn. and Obst., vol. vii, p. 299. (1908).

MCGAVIN, L. General Suppurative Peritonitis. Clin. Jour. (London), vol. xxxii, p. 197 (1908).

MCGUIRE, S. Treatment of Diffuse Suppurative Peritonitis. Amer. Jour. Obstet., vol. lvii, p. 275 (1908); also in Jour. Amer. Med. Assoc., vol. l, p. 1019 (1908).

MARTENS, M. Die Erkennung und Behandlung der Perforations peritonitis. Med. Klin., vol. iv, p. 1857 (1908).

MATTHES. Diagnose und Behandlung der akuten Peritonitis diffusa. München med. Wochenschr., vol. liv, p. 2211 (1907).

METCALF, W. F. Acute Peritonitis. Jour. Mich. Med. Soc., vol. vii, p. 440 (1908).

MOSCHEOWITZ, A. V. Allgemeine Peritonitis infolge von Appendizitis und ihre Behandlung. New York Med. Monatschrift, vol. xix, 1907.

MOYNIHAN, B. G. A. The Continuous Administration of Fluids by the Rectum in the Treatment of Acute General Peritonitis. Lancet, vol. ii, for 1907, p. 432.
MOORE, —. Treatment of Diffuse Suppurative Peritonitis without Drainage. Dominion Med. Monthly, vol. xxxi, p. 457 (1908).
MOORE, W. Four Cases of General Peritonitis. Intercolon. Med. Jour., Australia., vol. xiii, p. 252 (1908).
MURPHY, J. B. Diffuse Suppurative Peritonitis. Amer. Assoc. Obstet. and Gynec., vol. xix, p. 177 (1907).
MURPHY, J. B. Proctoclysis in the Treatment of Peritonitis. Jour. Amer. Med. Assoc., vol. lii, p. 1248 (1909).
OCHSNER, A. J. Prevention and Inhibition of Diffuse Suppurative Peritonitis. Illinois Med. Jour., vol. xv, p. 517 (1909); also in Boston Med. and Surg. Journal, vol. clxii, p. 161 (1910).
PATON, J. M. Study and Treatment of Acute Peritonitis. Med. Press and Circular, new ser., vol. lxxxix, p. 248 (1910).
PICHEVIN, R. Des Lavages Abdominaux dans l'Infection péritonéale. Semaine Gynec., vol. xiv, p. 289 (1909).
PORTER, M. F. Diffuse Peritonitis from Perforation of the Duodenum. Fort Wayne Med. Jour.-Mag., vol. xxviii, p. 128 (1907).
REED, R. J. Treatment of Perforative Peritonitis. West Va. Med. Jour., vol. iii, p. 219 (1909).
RICH, E. C. Treatment of Suppurative Peritonitis following Appendicitis. Utah Med. Jour., vol. xxix, p. 38 (1909).
ROBINSON, B. Anatomic and Physiologic Rest of the Peritoneum in Peritonitis. Boston Med. and Surg. Jour., vol. clvii, p. 634 (1907).
ROBSON, M. Modern Treatment of General Peritonitis. Brit. Gynæc. Jour., vol. xxii, Supplement p. 128 (1907).
ROGERS, J. Extensive Peritonitis. Ann. Surg., vol. xlix, p. 709 (1909).
ROLLESTON, H. D. Diseases of the Peritoneum. In Osler's Modern Medicine, 1908, vol. v, pp. 495–598.
ROOTH, H. C. Treatment of General Peritonitis. New York State Jour. of Med., vol. viii, p. 416 (1908).
ROSS, J. F. W. Treatment of Acute General Septic Peritonitis. Amer. Jour. Obst., vol. lviii, p. 404 (1908).
ROTTER. Zur Behandlung der diffusen Peritonitis. Deutsche Med. Wochenschr., vol. xxxvi, p. 529 (1910).
SENCERT, L. Deux cas des Péritonites auguës généralisées traitées par la Méthode oxygénée de Thiriar. Rev. Méd. de l'Est, vol. xli, p. 12 (1909).
SADLIER, J. E. Acute Diffuse Suppurative Peritonitis. Albany Med. Ann., vol. xxx, p. 647 (1909).
SIEGEL, E. Die Behandlung der Peritonitis. Wien. klin. Rundschau, vol. xxi, p. 827 (1907).
SMITH, H. H. A Few Points about the Causes, Diagnosis and Treatment of Acute General Peritonitis. New Zealand Med. Jour., vol. viii, p. 37 (1909).
STOCKTON, C. G. The Opium Treatment of Peritonitis. Buffalo Med. Jour., vol. lxiii, p. 373 (1908).
TOREK, F. Peritonitis due to Appendicitis. New York Med. Jour., vol. lxxxviii, p. 1068 (1908). Also in German in N. Yorker Med. Monatschr., vol. xx, p. 233 (1908).
WATHEN, J. R. Diagnosis and Treatment of General Peritonitis. Kentucky Med. Jour., vol. viii, p. 1150 (1910).
WATHEN, W. H. Acute Suppurative Peritonitis (Local and General). Jour. Amer. Med. Assoc., vol. xlviii, p. 1919 (1907).
WESTERMAN, C. W. J. Ueber die Anwendung des Dauermagenhebers bei der Nachbehandlung schwerer Peritonitis-fälle. Zentralb. f. Chir., vol. xxxvii, p. 356 (1910).
WILKIE, D. P. D. Post-Operative Peritonitis. Med. Chron., vol. li, p. 343 (1910).
WILKIE, D. P. D. Serum Therapy in Acute Peritoneal Infections. Jour. Path. and Bacteriol., vol. xiv, p. 270 (1909).
WILLIAMS, J. T. Peritonitis without Ascertainable Cause. Brit. Med. Jour., vol. i, for 1907, p. 260.
WILLIS, P. W. Treatment of Acute Septic Peritonitis. Northwest Med., vol. v, p. 77 (1907).
WILLMOTH, A. D. Treatment of Acute Diffuse Peritonitis. Kentucky Med. Jour., vol. v, No. 9, p. 40 (1907); also in Amer. Pract. and News, vol. xli, p. 109 (1907).
WINSLOW, R. Some Post-Operative Complications of Peritonitis. Maryland Med. Jour., vol. li, p. 182 (1908).

THE VALUE OF PHENOLSULPHONETHALEIN IN ESTIMATING THE FUNCTIONAL EFFICIENCY OF THE KIDNEYS[1]

BY CHARLES GOODMAN, M. D.

Surgeon to the Sydenham Hospital and Montefiore Home; Associate Surgeon to Beth Israel Hospital; Chief of the Surgical Department of Mt. Sinai Hospital Dispensary, New York City

AND

LEO KRISTELLER, PH. D.

Resident Physiological Chemist of Montefiore Home, New York City

THE purpose of this paper is to present before you for consideration some clinical observations with one of the more recent methods of determining the efficiency of the kidneys, and by manner of introduction reference will be made to some of the more important methods heretofore devised.

When we take into consideration that the exact phenomenon involved and the process of excretion by the kidneys is still a matter of more or less speculation, an attempt to establish an index of their work is accompanied with difficulties. A routine chemical microscopical and bacteriological examination of the urine usually reveals the presence of disease of the kidney. The X-ray may reveal changes in its contour, or the

[1] Read before the stated meeting of the Genito-Urinary Section of the New York Academy of Medicine, November 16, 1910.

presence of calculi. With the cystoscope and ureteral catheters we may be able to establish the presence of disease in one or both kidneys. These methods, however, afford no definite information as to the extent of the pathological process under consideration, nor the functionating capacity of the kidney. To the surgeon confronted with the necessity of operating, particularly where the removal of a kidney may become necessary, it is a question of first importance whether the other kidney present is capable of sustaining life.

Many methods have been elaborated upon for estimating the sufficiency of the kidneys, and by these means the mortality of operation on the kidneys has been greatly reduced.

The methods of estimating quantitatively the metabolism in the body requires prolonged research with special laboratory facilities and is therefore practical only in exceptional cases.

The manner of obtaining the molecular concentration of the total solids excreted in the urine by cryoscopy, as elaborated by Koranyi, may be used as a supplementary test. The results of the cryoscopy are influenced by so many factors that errors from its use have now brought the method into disfavor.

The electrical conductivity test introduced by Dawson Turner determines the amount of mineral content of the urine. It is an estimation in ohms of the resistance, and is dependent upon the ions in the solution. The complicated and expensive apparatus and the errors which may arise during its use, in the absence of an accurate knowledge of the diet and water intake, render this test impracticable for general use.

The method of chromocystoscopy, that is to say, the administration by mouth, or preferably subcutaneously, coloring matters such as are readily excreted by the kidneys, is of greater or less practical value. It serves at least in localizing the ureteral orifices.

Methylene blue was introduced for this purpose by Archard and Castaigne. The drug is given by mouth in one-quarter grain doses, or preferably fifteen minims of a 5 per cent solution is administered by hypodermic injection. In health the drug will dye the urine in about one-half hour, while in the presence of disease of the kidneys this is delayed. Methylene blue is of little value however in estimating the functionating capacity of the kidneys, because it is slowly eliminated, and therefore requires observation for a long period of time. It has been estimated that only about 50 per cent of the drug is excreted normally in the urine. It does not lend itself, moreover, to accurate colorimetric estimation.

Indigocarmine was first used by Haidenhein in his investigation of the physiology of the kidneys, who showed that this drug was excreted by the epithelial cells of the convoluted tubules. Voelcher and Joseph, assistants of Czerny of Heidelberg, proposed the use of this dye for the purpose of testing the renal function. After an intramuscular injection of 20 cc. of a 4-10 per cent solution, the drug should appear in the urine of a healthy individual in less than one half an hour, and is delayed in the presence of disease. The delay of its appearance and the diminished intensity of the colors of the stream ejaculated from the ureters as revealed by the cystoscope is supposed to afford an estimation of the relative amount of destruction of the secreting epithelium of the convoluted tubules. This dye has the advantage of being more readily eliminated than methylene blue, but has the decided disadvantage of being decolorized by purulent alkaline urine. It does not lend itself to colorimetric estimation, and only about 25 per cent is eliminated by the kidneys.

Rosaniline (rosaniline trisulphate of soda), first introduced by Lapine, has not attained any popularity. One cc. of a one per cent solution injected subcutaneously, usually makes its appearance in less than one-half hour. From 65 to 95 per cent is recovered in 24 hours.

Alberann's polyuria test is based upon the principle that the greater the destruction of epithelium in the kidney the less likely will that organ respond to an increase in secretion after the administration of quantities of water. This is fallacious, to be depended upon alone. This would be very helpful were it true that the secretion of the fluid contents of the urine were dependent upon the tubular epithelium alone. But that is not the case. It has been repeatedly shown that the fluid portion, together with some of the salts both organic and inorganic, are secreted by the glomeruli. It is now well known that a kidney practically devoid of tubular epithelium, such as is frequently encountered in advanced cases of interstitial nephritis, is capable of eliminating almost unlimited quantities of fluid. In such instances the polyuria test could be no index whatsoever of the kidney's efficiency to maintain life.

The phloridzin test championed by Casper and Richter is based upon a peculiar property of phloridzin discovered by Von Mehring, by virtue of which a glycosuria is produced after a subcutaneous injection of 5 mg. of a freshly prepared

aqueous solution. In course of twenty to thirty minutes, after an injection into a healthy individual, glucose can be demonstrated in the urine. The relative delay and diminished quantity of sugar excreted within a certain time, say two or three hours, is supposed to afford an index of the extent of destruction of the secreting portion of the kidney. This test has now become unpopular on account of its unreliability. Instances are cited where glycosuria was not produced at all in healthy individuals after its administration. This irregularity of action may be due to other influences than those resident in the kidney. Work recently done by Schwartz in Paltauf's institute in Vienna goes to show that the function of the adrenals plays an important rôle in the production of glycosuria by phloridzin. For example, the total extirpation of the adrenals (an experiment which is perfectly feasible in male rats) prevents the production of glycosuria by phloridzin.

In the early part of this year, L. G. Rowntree and J. T. Geraghty published a preliminary report on the use of phenolsulphonethalein in estimating the efficiency of the kidneys.

The total elimination of this drug by the kidneys suggested the possibility of applying this dye in the estimation of the efficiency of the kidneys. The properties of this drug were discovered by Professor Abel in the course of some work with the phenolthalein group of drugs.

Abel and Rowntree have shown that a properly prepared solution of the sodium salt can be used subcutaneously without the slightest evidence of an irritant action; "that the drug can be administered by mouth with no ill effects"; "that the administration of the drug in one-tenth grain doses, or less by mouth, is followed by its appearance in the urine in one hour to an hour and a half"; "that the subcutaneous administration is followed by the appearance of the urine in about ten minutes."

The technique elaborated by Rowntree and Geraghty for the purpose of utilizing this drug as a functional test is described by them as follows:

"A solution of 0.6 gram of phenolsulphonethalein and 0.84 cc. of an 8 per cent solution NaOH are added to 0.75 per cent NaCl solution. This gives the monosodium or acid salt, which is red in color and which is slightly irritant locally when injected. It is necessary therefore to add two or three drops more of the 8 per cent hydroxide in quantities sufficient to change the color to a Bordeaux red. This preparation is non-irritant. One cc. of this solution, containing six mg., is administered subcutaneously in the upper arm by means of an accurately graduated syringe. The time of the injection is carefully noted. A faint pink tinge can be usually noted in about ten minutes if the urine is collected in a vessel containing one or two drops of a 25 per cent NaOH solution. In order to insure a free urinary secretion, it is recommended that 300 or 400 cc. of water be administered about twenty minutes before injecting the drug. We have not found this precaution necessary. If the patient cannot void, as in retention due to an enlarged prostate, a catheter is inserted, and as soon as the reaction is demonstrated, the catheter is corked and the bladder drained at the end of the first hour and the second hour. If the urine is collected from each kidney by use of the segregator or preferably ureteral catheterization, the amount of the drug excreted by each organ can be estimated. In acid urine the color displayed is yellow or orange, and this immediately gives place to a brilliant purple red upon the addition of an alkali.

"The solution is now placed in a liter measuring flask and distilled water added to make accurately one liter. It is then thoroughly mixed and a small filtered portion taken to compare with the standard, which is used for all these estimations. The standard solution, used for comparison, consists of three mg. of phenolsulphonethalein (or one-half cc. of a solution used for injection) diluted up to one liter and made alkaline by the addition of one or two drops of a 25 per cent sodium hydrate solution.

"This is a purple red solution, retaining its intensity of color for weeks, or for an indefinite period. The one solution therefore serves for an immense number of tests.

"One cup of the Duboscq colorimeter (right) is half filled with this standard solution used for comparison which has just been described, and the plunger lowered so that the indicator reads at 10.

"A varying quantity, depending upon the intensity of the color of the diluted urine, is placed in the other cup and the plunger manipulated until two halves of a field are of an identical intensity of color. The indicator of the left plunger is now read, the fraction, as indicated by the Vernier scale, being taken into account. The estimation of the quantity present is then a question of simple arithmetic.

"For instance, the left side reads at 20, the standard being placed at 10. In other words it takes a column of fluid twice as long to give the same intensity of color as that of the standard,

which of course shows that the solution contained only half as much dye.

"To obtain the percentage of dye excreted in the urine, compared with the amount in the standard solution used for comparison, it is necessary to multiply the reading of the standard by 100 and divide by the reading indicated for the solution containing the urine. To return to our example, we have $\frac{10 \times 100}{20}$ equals 50 per cent as much drug in the urine as in the standard solution.

"The three mg. to the liter standard comparison has been chosen arbitrarily because of the beautiful pink color which is obtained when the indicator stands at 10. The amount of the drug used for injection is 6 mg.

"We have compared the amount of the drug in the diluted urine with that of the standard for comparison, but if we wish to estimate the amount of drug secreted, as compared with the amount of drug administered, we must compare the amount excreted with 6 mg. rather than 3 mg. In the example given above, we must have 50 per cent of the 3 mg., or 25 per cent of 6 mg., which was the amount injected; so that the excretion is 25 per cent of the amount administered.

"With the Duboscq instrument, it is possible to detect a difference of 0.04 mg. of phenolsulphonethalein, the accuracy of the quantity estimated is therefore assured with certainty. Neither the normal coloring matter nor accessory pigment present in the urine, nor the presence of pus, influence the color of the dye. The method is a very sensitive one, the object of the test being to estimate the quantity of the drug excreted.

"The technique of the test is quite simple. The injection is given, the urine is collected for the first hour and for the second hour. To each sample sufficient sodium hydrate is added to insure alkalinity and maximum intensity of color, then the solution is diluted to a liter and a few cc. are filtered, the reading is made, and the per cent of the drug secreted is calculated."

Shortly after my personal interview with Doctor Geraghty, during my visit to Johns Hopkins, in March, 1910, I decided to make a trial of this method at the Montefiore Home. With the assistance of Dr. Kristeller, the resident physiological chemist who made the colorimetric estimations for me, we quote the following:

Our total number of injections were about 70 on 58 subjects. (Some of our early experiments are omitted in this report because the preparation of the solution and the technique employed differed somewhat from that described by Drs. Rowntree and Geraghty.)

SERIES I.

Our first subjects were healthy men. Each received 6 mg. of phenolsulphonethalein subcutaneously with the following results:

D. O. R.	Age 52	67 per cent.
F. R. I.	Age 24	52 per cent.
F. A. W.	Age 25	70 per cent.
N. A. T.	Age 27	66 per cent.
S. L. O.	Age 24	42 per cent.
E. H. R.	Age 23	67 per cent.
K. R. I.	Age 30	59 per cent.
F. R. B.	Age 28	75 per cent.

Healthy Males.

Phenolsulphonethalein .006 g. Subcutaneously.

Case	Age	Amount of drug recovered		
		1st hour per cent	2d hour per cent	Total per cent
D. O. R.	52	..	..	67
F. R. L.	24	..	..	52
F. A. W.	25	..	..	70
N. A. T.	27	..	..	66
S. L. O.	24	..	..	42
E. H. R.	23	50	17	67
K. R. I.	30	48	11	59
F. R. B.	28	51	24	75

Average for 2 hours, 62½ per cent.
Average time for first appearance, 10 minutes.
No reaction in specimens obtained 8 hours after injection of drug.

The average length of time for the first appearance of the dye was 10 minutes. The average per cent of dye recovered at the end of two hours was 62 per cent.

No reaction obtained six to eight hours after injection was given.

The per cent recovered in healthy individuals as reported by Rowntree and Geraghty is 60 to 85 per cent. The slight difference in time of estimation readily accounts for the slight difference obtained in our results. We computed from the time of the subcutaneous injection while in their reports they note from the time that the drug is first demonstrated in the urine.

Two of my cases presented for operation, in the next series, are of sufficient interest to warrant their report somewhat in detail:

CASE 1. R. W., woman, age 48, admitted to my service at the Beth Israel Hospital July 4, 1910, with a history of pain of two days' duration in the region of the right hip and flank and radiating to the iliac region; vomiting and chills followed by temperature. She had voided a moderate quantity of urine without pain, six to eight times in twenty-four hours.

Examination revealed marked sensitiveness over both kidney regions, particularly the right kidney, which seemed considerably enlarged. Her temperature was 103°. The urine, specific gravity 1010, contained a trace of albumen and showed many pus cells microscopically. She had a leucocytosis of 13,600, and polynuclear count of 80 per cent.

Cystoscopy, July 6th. A catheter introduced into the right ureter seemed to meet with an obstruction at about

8 inches and no urine obtained. I also catheterized the left ureter and obtained a fair quantity of clear amber-colored urine which gave a marked reaction to phenolsulphonethalein two hours after a subcutaneous injection of 6 mg. The dye could be detected in the urine for thirteen hours subsequent to its first appearance.

The kidney regions were radiographed and the picture showed a distinct shadow in the right ureter about two inches below the pelvis of the kidney. The left kidney showed three large distinct shadows. It was deemed advisable to first relieve the right kidney from its apparent obstruction.

Operation, July 11th. The right kidney was exposed and delivered. It was found very much enlarged and distended. An incision was followed by the evacuation of a large quantity of foul purulent urine. The upper portion of the ureter was palpated and a calculus felt about two inches from the pelvis. This calculus was found firmly impacted in the ureter. After its removal, the ureter was sutured and the kidney replaced. Gauze drains were inserted at either angle of the wound and the remainder of the wound sutured.

Two days later phenolsulphonethalein injected subcutaneously was demonstrated on the dressing as well as in the urine from the bladder (showing that the kidney was again functionating).

Functional test, July 26th. Cystoscopy and ureters catheterized; one cc. of the drug solution injected. Reaction of the dye on the addition of solution of sodium carbonate was obtained in 11 minutes from the right kidney after the injection was given. Four cc. of urine were obtained in 30 minutes. From the left catheter only one-half cc. of fluid was obtained during the first thirty minutes, and the dye did not make its appearance for one hour and twenty minutes. During the first two hours only traces of the drug were recovered. During the second two hours 34 per cent of the amount injected were recovered. The fluid from the bladder showed a very slight reaction. The patient had drunk very little fluid for some time previous to the cystoscopy. The catheters were left in situ for two hours and then withdrawn. Phenolsulphonethalein could be demonstrated in all the specimens collected for seven hours. During the first few days the average amount of urine excreted in 24 hours was 30 ounces. After this operation it averaged 43 ounces a day.

August 1st. Patient was again anæsthetized and the left kidney exposed and bisected. Three large calculi were found, one occupying the pelvis, while the other two were firmly wedged in the calices of the kidney so as to render the upper two-thirds of the kidney functionless. A smaller abscess, evacuated in the lower pole of the kidney, contained several small calculi. Considerable purulent fluid was also evacuated with the removal of the other calculi. The kidney was replaced and drains inserted and the remainder of the wound sutured. During the second twenty-four hours subsequent to this operation, the patient voided 74 ounces.

October 1st. Functional test. Reaction obtained from the right kidney in ten minutes and from the left kidney in 25 minutes. The amount excreted during the first hour was 21 per cent, and during the second hour 9 per cent, or a total of 30 per cent in two hours.

In our first test we recovered only a trace of the drug from the left kidney during the first two hours, while none was recovered from the right. We were now able to recover traces of the drug as early as 10 and 25 minutes respectively from the right and left, with a total excretion amounting to almost two-thirds of that under normal conditions.

SERIES II.

S. W., female, age 48, married.
July 6, 1910. Functional test, phenolsulphonethalein .006 g. Right kidney negative, left kidney, trace 2 hours.
July 11, 1910. Right nephrotomy and ureterotomy.
July 26, 1910. Functional test phenolsulphonethalein .006 g. Right kidney 11 minutes, left kidney 1 hour and 20 minutes. First two hours only trace recovered; second two hours 34 per cent.
August 1, 1910. Left nephrotomy.
October 1, 1910. Functional test. Phenolsulphonethalein .006 g. *Right kidney, 10 minutes; left kidney, 25 minutes.*
Amount of drug recovered: 1st hour, 21 per cent; 2d hour, 9 per cent; total, 30 per cent.

As the general clinical condition of the patient progresses, as the profound anemia and pallor disappears, as the function of the kidneys as manifested by the quantity and character of the urine improves, we find the phenolsulphonethalein reaction is proportionately increased.

Had we depended upon the X-ray alone in this case, we would have been induced to operate first on the left kidney. This would undoubtedly have resulted in death of the patient. The cystoscopy and the functional test showed that the recovery of the function of the right kidney was imperative, as the left kidney was not functionating sufficiently.

CASE 2. Mrs. L. For the permission of the report of this case I am indebted to Dr. Ladinski. He had operated on a woman, age 30, on May 4, 1910, at the Beth Israel Hospital, for perforation of the uterus, with sepsis following a curettage by a physician for an incomplete abortion at three and one-half months of pregnancy. The patient had had chills and fever, had vomited, and had complained of pain in the abdomen. She had a profuse, offensive purulent vaginal discharge. Subsequent to her operation, the patient had a continuous temperature, for several weeks, and developed a pyemic abscess with osteomyelitis of the left foot, which also required operation.

In July the patient complained of pain in the region of the left kidney; her urine contained pus and blood, and I catheterized the ureters on the 15th of July.

Six mg. of phenolsulphonethalein were injected subcutaneously and a reaction obtained from the right ureter in eight minutes. Only one or two drops of thick purulent material were obtained from the other catheter, and then it became clogged and nothing more came out. The urine collected for two hours from the right catheter showed by the Duboscq colorimeter that we had recovered 51 per cent of the drug. This is a fair average for the normal output of two kidneys. The patient was radiographed; the negative showed a large calculus occupying the pelvis of the left kidney with projections into the calices. Several smaller calculi were distributed in various portions of the kidney. The kidney itself appeared considerably enlarged.

July 16th the patient was anæsthetized, the left kidney was exposed and found to be very much enlarged and distended, firmly adherent. It was delivered with great difficulty on account of the shortness of its pedicle. The kidney was incised and found to contain a large quantity of foul-smelling purulent fluid. The pelvis was occupied

by a large calculus, while the parenchyma contained several abscess cavities with calculi. The entire secretive portion of the organ appeared to be entirely disintegrated. The kidney was removed. The patient has made an uneventful recovery.

The functional test has averaged 52 per cent of the drug in two hours. The test made a few days ago showed that 43 per cent and 10 per cent of the drug were recovered during the first and second hour respectively, or a total for two hours of 53 per cent.

CASE 3. A. L., male, age 19, cigarette maker, was referred to me about one year ago with multiple calculus-pyelonephritis. The kidney was drained and removed at a secondary operation. Since the removal of the left kidney the boy has returned to his work and has been feeling quite well. His urine is negative. I have tried the functional test on this case several times recently, and he shows an output varying from 52 to 56 per cent.

CASE 4. J. K., a married woman, age 31. The patient complains of cramplike pains off and on for about seven years. At first the pain appeared about once each year. Recently, however, her attacks would come every month or two. These attacks lasted usually twenty-four hours, with pain radiating from the left lumbar region downwards toward the bladder and accompanied by retching, vomiting, and followed by exhaustion.

Her urine during these attacks was acid, sp. gr. 1018, with a trace of albumen, a few hyaline casts and urate and oxalate crystals.

October 31st. Ureters were catheterized. In attempting to pass the catheter into the left ureter, it met with an obstruction at a distance of about one and one-half inches. The right catheter was introduced without any difficulty. With the functional test, a slight pink reaction was obtained from the right catheter in eight minutes, and the same from the left in 18 minutes. The quantity of the drug recovered in one-half hour from the right side was 8.9 per cent, while from the left side, only 1.1 per cent.

The test showed that the right kidney was doing eight times the work of the left.

A radiograph taken showed a dumbbell shaped shadow in the region of the left ureter one and one-half inches from the ureteral orifice.

CASE 5. Mrs. R. B., age 32, was referred to me for cystitis with hematuria, resisting the usual form of treatment. The woman was then in her sixth month of pregnancy.

Cystoscopy revealed an inflamed bladder with a mass occupying the region of the trigonum resembling a polyp. On account of her pregnancy, the operation was deferred until after her delivery. The hematuria persisted. She otherwise had a normal postpartum.

Ten days after delivery, I performed a suprapubic cystotomy and found a large granuloma in the region of the trigonum, which was curetted and cauterized. From the right ureteral orifice, cheesy material was ejected when massage was applied to the abdomen. The ureters were catheterized and the specimens examined bacteriologically, and were found to contain many t. b. c.

The infant was taken from the breast and the mother sent to the country. The general condition of the patient was considerably improved. She gained about 35 pounds in weight and the symptoms of hematuria have ceased.

Functional test made in October. First hour; right kidney, 13⅓ per cent. First hour; left kidney, 9.4 per cent. The bladder fluid contained 4 per cent, a total of 30 per cent recovered.

CASE 6. Mrs C., age 27, inmate of the Montefiore Home, with an osteomyelitis of pelvic bones, probably originating in the left sacroiliac synchondrosis. She has a sinus leading to the articulation, from which there is more or less seropurulent discharge.

The patient was of the opinion that urine was escaping from this wound. A radiograph did not assist us much in clearing up the origin of the disease.

The ureters were catheterized, no obstruction was found, and the specimens obtained were negative.

Functional test showed a normal output of 49 per cent during the first hour.

An alkaline dressing was applied to the sinus and the discharge did not show any reaction. We think it safe to infer in this instance that this sinus has no direct communication with either kidney or ureter.

CASE 7. L. N., married woman, age 35. History of attacks of renal colic on and off for over two years.[1] She had consulted various dispensaries and was advised to go to the hospital to have a calculus removed from a kidney.

She had passed some gravel in her urine a few days previous to my examination.

July 27th. Functional test. Reaction was obtained on the right side in eight minutes and on the left in three minutes.

The urine, collected from both sides, showed a few blood cells, many pus cells, and a large quantity of urates. A radiograph taken proved negative. Operation was deferred.

The following are a series of cases at the Montefiore Home, whose urine upon repeated examinations has been negative with the exception of the presence of more or less indican:

J. Lippman, age 42, mediastinal tumor. Indicanuria, 59 per cent.
Weisser, age 58, neurasthenia. Indicanuria, 52 per cent.
Browitz, age 45, prog. musc. atrophy. Indicanuria, 50 per cent.
Gentzer, age 38, neurasthenia. Indicanuria, 45 per cent.
Epstein, age 26, asthma and ch. bronchitis. Indicanuria, 83 per cent.

SERIES III.

The functional tests used heretofore have found their greatest value in surgical conditions of the kidneys, little or no value being ascribed to them in cases of nephritis.

In acute nephritis and in chronic parenchymatous nephritis, normal or excessive permeability has been demonstrated with the dyes heretofore applied.

Our experience with the drug in nephritis leads us to infer that the dye may prove of value in estimating the functional activity in this disease. In a series of cases of chronic parenchymatous nephritis, the results with the test were as follows:

Street, male, age 65, chronic parenchymatous nephritis, complicated with large abdominal tumor; reaction in 20 minutes; first hour, 15½ per cent, second hour, 18 per cent. Total 33½ per cent.

[1] This case belongs to a group who give a history of attacks resembling renal colic. The urine does not contain albumen but shows quantities of urates and oxalates. Such cases are frequently referred to the surgeon for nephrotomy, and when operated upon nothing is found. The functional test in several of this class of cases showed a diminished elimination of phenolsulphonethalein.

Krewitz, age 12, chronic parenchymatous nephritis, 10 minutes; 25 and 17 per cent.
Segal, age 59, chronic parenchymatous nephritis, 11 min.; 20 and 8 per cent.
Snodowsky, male, age 33; 16 per cent.
Goetoff, male, age 22 (t. b. c.), 5 min.; 1st hour 26 and second hour 15 per cent.
Sachs, male, age 33 (edema), 15 min.; 8 per cent 1st hour.
Berkowitz, male, age 67; 40 min.; 1st hour, 25 per cent.
Goldberg, male, age 52; 1st hour, 11 per cent.
Atlas, female, age 53 (cholelithiasis); 15 min.; 1st hour, trace, second hour, 20 per cent.

These results obtained were quite in accord with the clinical condition of the patients.

Chronic Parenchymatous Nephritis.

Case	Sex	Age	Complication	Amt. Drug	Time of Appearance	Amt. Recovered		
						1st Hour Per Cent	2d Hour Per Cent	Total Per Cent
S. T.	Male	52	Abdominal tumor	.006g	20″	15½	18	33½
K. R.	Male	12	1 wk. of treatment	.006g	10″	25	17	41
K. R.	Male	12	1 wk. of treatment	.006g	10″	41	8.3	49.3
S. E.	Male	59		.006g	11″	20	8	28
S. N.	Male	33	Multiple sclerosis	.006g				16
F. A.	Male	19	Anemia	.006g	5″	26	15	41
S. A.	Male	33	Edema	.006g	15″	8		
B. E.	Male	67		.006g	40″	25		
G. O.	Male	52		.006g		11		
A. T.	Fem.	53	Cholelithiasis	.006g	15″	tr.	20	20

SERIES IV.

ACUTE DIFFUSE NEPHRITIS

Sadie Marcus, acute diffuse nephritis; 1st 2 hours, 15 per cent.
Mrs. Kaplan, acute diffuse nephritis; 1st 2 hours, 19 per cent.
Mrs. Goldberg, acute diffuse nephritis; 1st 2 hours, 22 per cent.
J. Feinberg, subacute diffuse nephritis; 1st 2 hours, 22 and 7.5 per cent; after one week of treatment, 35 and 13 per cent.
Beatrice Garlick, anuria and convulsions, 24 per cent.

Acute Diffuse Nephritis.

Case	Sex	Age	Complication	Amt. Drug	Time of Appearance	Amt. Recovered		
						1st Hour Per Cent	2d Hour Per Cent	Total Per Cent
S. M.	F.	19		.006g	19″			15
M. K.	F.	m'd		.006g				19
M. G.	F.	m'd		.006g				22
J. F.	M.	40	Subacute nephritis	.006g		22	7.2	29½
J. F.	M.	40	1 wk. treatment	.006g		35	13	48
B. G.	F.	16	Anuria with convulsions 24 hrs.	.006g			24*	
M. S.	M.	21	Delirious; albumen 0.3 per cent	.006g		0	0	d'th

* Followed by recovery.

The results of percentage of drug recovered in these cases, compared with the clinical condition noted at the time of the test.

The case of Beatrice Garlick is of special interest.

She had complete suppression of urine with convulsions for over 24 hours, which were relieved after treatment, and the functional test immediately showed a 24 per cent elimination during the first two hours. This patient made a gradual but positive recovery.

Another case of interest is that of a young man, H. S., age 21, who was ill one month with symptoms of acute nephritis with delirium. His urine was sp. gr. 1016, with albumen 0.3 per cent. Although he was considered a very sick patient the clinical symptoms did not indicate that they would prove fatal. Functional test on October 25, 1910; no reaction of the phenolsulphonethalein could be obtained. Patient expired.

Here was a case where the doctors in attendance held out a reasonable hope of recovery. The functional test alone disclosed the real hopeless condition of the patient.

The postmortem revealed an acute nephritis on top of a chronic parenchymatous nephritis.

SERIES V.

CHRONIC INTERSTITIAL NEPHRITIS

F. B., cystitis and chronic interstitial nephritis; 18 per cent first hour.
Mrs. O., chronic interstitial nephritis; 14 and 18 per cent.
Meyer Marks, an acute, superimposed on a chronic interstitial nephritis.

October 25th, functional test made and only traces of the drug were recovered during the first and second two hours. The same day that this result was obtained the patient developed uremic convulsions, and recovered only after heroic treatment.

Chronic Interstitial Nephritis.

F. B.	Fem.	Cystitis	.006g	..	18		
M. O.	Fem.		.006g	..	14	18	32
M. M.	Male	Acute nephritis with chronic interstitial	.006g	..	tr.	tr.	*

* Uremic convulsion.

In obstruction of the urinary tract due to enlarged prostate our experience is limited to five cases.

Two of these men, age 68 and 67 respectively, with small amounts of residual urine, showed reaction to the test in fifteen minutes, and 49 and 36 per cent respectively were recovered in two hours.

The third case, with a history of repeated retention and catheterization, showed an output of only 20 per cent.

The other two cases, without retention and without residual urine, excreted 70 and 74 per cent respectively.

Glick, age 60, reaction 15 min., 1st hour, 19 and 20 per cent, 2d hour, total 49 per cent.

Klepper, age 68, reaction 15 min.; 1st hour, 26 and 10 per cent 2d hour; total 36 per cent.

M. S. W., age 63, trace and 20 per cent.

Berkowitz, age 67, 42 and 28 per cent; total 70 per cent.

Weiss, age 65; 35 and 36 per cent; total 74 per cent.

Enlarged Prostate.

Case	Age	Amount of Drug	Time of Appearance	Amount Recovered		
				1st Hour Per Cent	2d Hour Per Cent	Total Per Cent
Residual urine:						
G. S.	68	.006g	15	19	20	49
K. S.	67	.006g	15	26	10	36
No residual urine:						
B. E.	67	.006g		42	28	70
W. E.	65	.006g		38	36	74
Retention and catheterization:						
M. S. W.	63	.006g		trace	20	20

The results obtained by Geraghty and Rowntree and myself warrant the conclusion that the elimination of the drug goes hand in hand with the elimination of the normal products of metabolism, a fact for which this method is bound to prove of greater value than any other heretofore devised.

Résumé: Phenolsulphonethalein possesses the following advantages:

1. The drug does not readily decompose in solution and can be sterilized by boiling.
2. The dose required is small, one cc. of solution containing .006 g. of the dye.
3. The injection is painless, and is not followed by irritation if the solution is sufficiently alkaline.
4. The drug is excreted entirely by the kidneys.
5. The drug can be demonstrated in the urine in from three to ten minutes after the subcutaneous injection.
6. From 50 to 70 per cent is excreted during the first two hours.
7. The drug lends itself to accurate colorimetric measurement.
8. The quantity of dye recovered in a specimen within a given time is not influenced by the volume of urine.
9. The presence of pus, phosphates, bile, and indican does not interfere with the colorimetric estimation of this drug.

I desire to express my thanks and appreciation to the various members of the attending staff and house staffs of both Montefiore Home and Beth Israel Hospital for the material submitted and kind assistance rendered.

PNEUMATIC RUPTURE OF THE INTESTINE, A NEW TYPE OF INDUSTRIAL ACCIDENT[1]

By E. WYLLYS ANDREWS, M. D., Chicago, Illinois

GASEOUS tumefaction, pneumatocele or air tumor is a striking phenomenon seldom seen in traumatic cases save in injuries to the respiratory organs.

I will now report a case of pneumatic distension of startling proportions due to another cause, insufflation of the rectum by compressed air.

May 5, 1910, a man entered my ward at Mercy Hospital nearly moribund, cyanotic, and gasping for breath, with an enormous distension of his whole trunk by what proved to be air. The chest and neck were emphysematous. The abdomen was tightly distended, more globular than in diffuse peritonitis, so that even the skin was tense. Before a Polish interpreter was obtained the case certainly presented puzzling features, but when the fact was related that air at sixty pounds pressure had been forced into his anus the mechanism of the injury was easily understood.

Dr. T. R. Hinchmon, who first saw the patient, informs me, "The man was brushing or blowing the dust from his clothes and on blowing the back of his trousers, the men put the hose to his rectum. The patient tried to get away, but the others followed until the injured man fell. Witnesses claim that it all occurred in a moment and the injured man fell almost immediately. At least the injury

[1] Read before the Chicago Surgical Society, November 11, 1910.

occurred in a fractional space of time as the victim scarcely moved off his place.

"The hose was not inserted in the rectum, as the man was fully and "tightly" dressed. So tight were his clothes, due to the distension, that they scarcely opened the belt which he wore around his waist twenty minutes after the accident; the distension was very great. The abdomen was tensely inflated and the free air was felt over the groin and along the attachments of the diaphragm. The thorax was rigidly set and breathing very fast, 46–52 and shallow, the features were anxious and pinched, the pulse small, hard and about 144. No gas was expelled and no gas belched at any time. These are about the facts of appearance of the case and the symptoms. He looked like a case of great apprehension and moaned continually.

"The air pressure of this pipe is estimated to be between 60 and 65 pounds, not under 60 and possibly not above 67 pounds; there was no nozzle, just a plain five-eighths inch hose; the air is used for blowing saw dust off the machinery, walls, and inside of barrels, places which cannot easily be swept."

When examined at the hospital the conditions were the same, cyanotic, face shallow, respiration and pulse almost gone. There was a gradual emphysema extending to the clavicles and down to the groin, and enormous distension of the belly. A rectal tube was inserted and gave no return of air. Dr. Pierce saw the man promptly, and, as no major operation seemed possible, he made an incision under local anæsthesia into the peritoneum. There was a strong rush of escaping air, which was held in check by a tampon so as not too rapidly to collapse the abdomen. Half an hour later patient had a chill but was much improved. Cyanosis had disappeared. Pulse, 120, temperature, 99°, respiration, 36.

I found him a few hours later with a pulse of 108, temperature 99°, respiration 36. It was certain that the intestine was ruptured and I opened the abdomen at once.

Operation. Laparotomy, five hours after the injury. Median incision below umbilicus showed a peritoneum already much soiled by feces and full of bloody serous exudate. The serosa was much reddened and even distant parts showed irritation. The sigmoid colon was ruptured along the convex border for a distance of five or six inches with a gaping tear in its serous and muscular coats, through which the mucous coat bulged, but was not so widely torn. The inner coat showed only three lacerations, one 3 cm. in diameter and two smaller, showing that it had herniated or stretched out through the tear in the fibrous wall and then retracted after perforating and letting the air escape. The integrity of the bowel was so much compromised that I thought better to resect the sigmoid rather than sew up the tear. This was done in the usual way, the ends inverted and a lateral anastomosis made between them as they lay side by side. Gutta percha drains and bismuth gauze drains were used for a few days in the after treatment. The abdomen was very thoroughly washed out through a multiple point irrigator with salt solution. Less peritonitis, tympanites, and sepsis followed than were expected from the inflamed appearance of the bowel. The patient had few alarming symptoms after twenty-four hours, and made a fairly rapid recovery, but was delayed somewhat in the final healing by a mild infection along the track of the drains. He recovered and is now well.

I have been interested in reviewing this case to find it is by no means as unique as I supposed when I did the operation. While it is scarcely mentioned in the literature I have found by correspondence and in the law reports records of fourteen other cases almost identical with mine. A brief history of these cases may be worth preserving. As several of them have been sent to me voluntarily on seeing the title of this paper, I have little doubt that other unpublished ones will come to light.

CASE 1. Dr. Fred Fletcher, Columbus, Ohio. Andrew Kumpf, age 36 years; at 4:30 P. M., May 28, 1907, he was initiated by his fellow workmen. Two men held him in a semistanding posture, while a third party pressed the nozzle of a compressed air apparatus used for riveting bolts, against a thin pair of overalls, directly over the external sphincter, and turned on not less than seventy pounds of compressed air. The intense pain increased the man's attempts to free himself, so that the current of air was not used for more than a second. When the "practical jokers" released their holds, the victim fell to the ground, complained bitterly of pain and showed such obvious symptoms of trouble that a physician was called and patient was sent to the hospital.

Examination. Two hours and a half later he presented the following complex symptoms: semisitting posture, pinched facies, and marked cyanosis from his inability to breathe. He was conscious, yet unable to talk because of the intense intra-abdominal pressure. The abdominal distension was something unusual. The abdomen was drumlike, and the abdominal wall so stretched that it actually felt thin. The labored respirations, from upward pressure on the diaphragm, made it possible to see a retraction of the chest wall at the costal insertions of the diaphragm. The thoracic percussion note was tympanitic as far as the third rib, above which it was hyperresonant. There was no dullness over the front or back parts of the abdomen, nor any evidence of external injury. The abdomen was so tight and tender that it was impossible, as it was impractical, to make a satisfactory examination. The rectum was patulous and empty. The patient was unable to pass flatus.

There was neither blood nor blood-tinged discharge coming from the rectum. On entering the hospital the patient was given a soapsuds enema, the greater part of which was retained. The temperature was 96.8° per mouth; the pulse 120. He complained of air hunger and excruciating pain with the occurrence of each peristaltic wave. He vomited 500 cc. of an offensive, greenish-colored material; was constantly nauseated, yet unable to eructate gas. A diagnosis of rupture of the bowel was made. He was given one grain and a quarter of morphin the first two hours after the accident, and there followed an unavoidable delay (because of his religion), so that it was nine o'clock before an operation was undertaken.

Operation. With the assistance of Dr. Blanchard, I opened the abdomen through the left rectus muscle below the umbilicus. On nicking the peritoneum, the escaping compressed air and intestinal gas tore the peritoneum for a distance of three inches. The force was such as to startle those present at the operation. The intestines were found collapsed, while the stomach was distended and floated low in the abdominal cavity. It was noted that the intestines, especially the small bowel, together with the mesentery, were covered with hemorrhagic spots, varying in size from a millet seed to that of a split pea. The abdominal contents were deeply injected. The intestines were eviscerated and inspected. The pelvic cavity contained a large amount of blood, feces, and the enema. Several loops of the ileum were covered with a greenish exudate.

Site of the intestinal laceration. On drawing the sigmoid flexure upward and to the left, a six-inch tear was found extending from the (constricted) junction of the rectum and sigmoid (in front of the body of the third sacral vertebra), into and along the convex border of the sigmoid. The laceration took an oblique course; it was clean cut through the mucous and muscular coats of the bowel, while the peritoneum was ribboned throughout the entire length of the tear. The position of the laceration, the first three inches being in virtually a fixed part of gut, and an unusually deep pelvis, made the operation difficult. The intestinal tear was closed with a No. 1 chromicized catgut and enforced with several Lembert sutures. The abdomen was flushed with two gallons of warm normal salt solution, and the toilet of the peritoneum was completed by introducing a large rubber tube through the median incision for drainage. The patient was returned to bed with a pulse of 120 and placed in the Fowler position.

Improvement followed this operation, but later obstruction developed and had to be relieved by colostomy. Finally the contracted bowel had to be resected and a ventral hernia closed after which excellent work recovery followed.

CASE 2. (Unpublished) from Dr. Tinley, Omaha. Sam Mavic, age 21, December 9, 1907. Was injured by his fellow workmen in play. They had

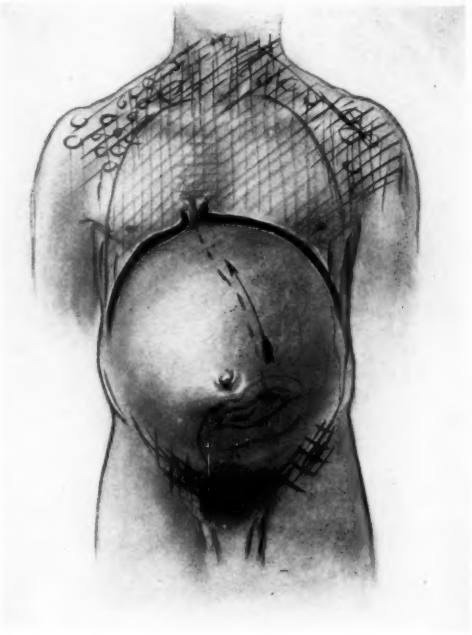


Fig. 1. Diagram of air-filled peritoneum and emphysema above, showing perforation of colon and diaphragm.

been chasing each other and turning the air hose upon their bodies. Finally one man grabbed poor Mavic and the other held it against his trousers. He screamed and said he had cramps. Not knowing what had happened the physician treated him for enteritis at first, but later Dr. Tinley writes: "His abdomen looked like a barrel and was immensely distended. He had a copious hæmorrhage from the bowel and I suspected the trouble. He understood little English and refused operation until it was too late." Drs. Updegraff and Summers of Omaha also saw him. He died in three days of general peritonitis. No autopsy reported.

CASE 3. From Texas, 1906, 96 Southwestern Reporter, 1073. Galveston and H. and S. Ry. vs. Currie et al., widow and child of J. B. Currie.

"By means of a main pipe of iron passing through it overhead, the roundhouse was supplied with compressed air, passing through the pipe from a storage tank, and from this main pipe there led downward into each engine stall a smaller track, also of iron, to which a rubber hose, one-half inch in diameter, should be screwed, for the purpose of using the air as a motive power; its pressure ranging from forty to one hundred pounds to the square inch. Each of these smaller pipes had upon it a globe valve, by which the amount of air turned into the hose could be regulated. 'Cracking' the

Fig. 2. Rupture of sigmoid showing exterior tear of outer coats.

valve, as used by the employees, meant the turning of it partially on. This compressed air was used, as shown by the testimony, as motive power, for loading wheels or heavy machinery, for running gear motors, for drilling and riveting, for cleaning flues, by boiler makers and machinists in the performance of their various duties, and in any other way when it could serve a proper purpose. On the occasion when Currie received the injury from which he died, Spahn, the hostler, had brought into the roundhouse an engine with an oil burner, in the ash pan of which oil was burning. Up to this time water had been used to extinguish fires in the engine, but, no water hose being at hand, Spahn, for the first time, and as an experiment, determined to use the compressed air to blow the fire from the ash pan, and, having attached a hose to one of the pipes, requested Currie who was standing by, to turn the valve. He succeeded in thus blowing out the flame, but the loud noise thus made attracted Nicholls and other employees to the spot. The fire was then out, and Currie had shut off the air, but Nicholls, apprehending that the valve confining the oil in the engine might not be properly set and that escaping oil, running over the hot surface, might reignite, directed Spahn to go upon the engine and see to the condition of the valve, taking from the hose which was still attached to the air pipe, and directed Currie to 'crack' or turn on the air. Some statements in the record, which counsel for defendants in error regards as presenting the aspect of the facts most favorable to them, are to the effect that Nicholls thus held the hose charged with air to be ready to blow out any fire that might spring up in the engine. This will be assumed to be true for the purposes of our decision. As Spahn ascended the engine, Nicholls turned the hose so as to strike him with the escaping air, causing him to jump and the bystanders to laugh. He then, almost immediately, according to some of the evidence, turned the hose upon Currie, so that the air struck him about the buttocks. That this was done in sport as a practical joke is conclusively shown by the evidence. No ill effects were at once noticed; but after a few moments, Currie became sick and complained that he was hurt, and upon subsequent medical examination and an operation it was demonstrated that the air had entered through the colon into the rectum, perforated and lacerated the intestines in many places, and escaped into the abdominal cavity outside of the bowel, eventually causing death. The physician who testified to the facts, stated that neither he nor any of the other doctors with whom he talked about the case, believed that such a thing could be possible until the unquestioned facts proved it, and that it was the most remarkable accident of which he had ever heard.

"The charge of the trial court submitted the cause to the jury under the ordinary rule, by which a master is made responsible for acts of his servant done in the line of his duty, and in the scope of his employment. The verdict necessarily affirmed that the act of Nicholls was of the character to make the railroad company liable under that rule, and the Court of Civil Appeals, in affirming the judgment, held that the evidence warranted such a finding."

CASE 4. Ballard, Admx. vs. Louisville and Nashville Ry. (Ky. 1908) 110 Southwestern Reporter 296.

"The facts set up in the petition are these: John Ballard was an apprentice in the defendant's machine shop at Corbin, Ky. He was an infant and had been in the shop only three days. There was another apprentice in the shop whose name was Hodge. While Ballard was engaged in his duties Hodge slipped up behind him with a compressed air hose, and turned the high pressure of air from the hose into Ballard's rectum, the air entering his bowels and rupturing them in such a way that he died shortly afterwards. Hodge had been serving his apprenticeship in the shop for about two years. He turned the air hose on Ballard as a prank. The superintendent of the shop, under whom both Hodge and Ballard worked, had knowingly permitted Hodge and the other apprentice boys in the shop to use this hose in a dangerous manner. The defendant knew that the hose was a dangerous appliance. Hodge had been using the compressed air hose in a playful manner while on duty with the defendant for some time prior to Ballard's death.

The defendant knew this, and permitted it without warning, restraining, or discharging Hodge. Hodge was a careless, reckless, and stupid boy, and utterly unfit to be working around or handling this dangerous air hose, or dangerous compressed air. The defendant knew this, or could have known it by the exercise of ordinary care. The defendant, knowing of the careless, reckless, and dangerous disposition of Hodge, and knowing of his conduct in connection with the use of the dangerous compressed air, negligently retained him in its employ, and negligently failed to exercise proper and reasonable supervision over his acts and conduct while in defendant's service, and negligently exposed John Ballard to the dangers and hazards of working with this reckless, unsafe, and unfit servant, dangers which were unknown to Ballard and from which he lost his life.

"Compressed air is used in all shops to blow away the filings or cuttings, so that the progress made by the tool may be seen. It is ordinarily entirely harmless. If turned on a person at any other point than near the rectum, it simply stings a little; and that the air, when striking near the rectum, would go through the clothes and into the rectum to such an extent as to rupture the bowels, would perhaps never occur to any one who had not heard of the possibility of such an accident. Compressed air is no more dangerous than the tools ordinarily furnished to the men to work with in shops."

Case was reversed in higher courts.

Case 5. (Unpublished.) Dr. Guy C. Boughton, Erie, Penn. John Niedzweiski, age 30, Jan. 31, 1910. "At the Iron Works one of his fellows placed an automatic compressed air tube to seat of his trousers while patient was stooping. He had suddenly black specks before his eyes, dizziness, pain, and desire to defecate. Taken home in great agony. Next day was brought to hospital. Great distension was present. Rectal tube gave no relief. Operation was made for ruptured intestine. Air escaped with a hissing sound on incising the peritoneum. Three perforations and a gangrenous area were found in the upper part of the sigmoid. These were repaired and the bowel wall inverted with Lembert sutures of linen. Fecal matter, dirt, etc., was removed by sponging (dry) and the wound closed with three rubber drains inserted at one end. Recovery was good in spite of some pulmonary congestion and cough, in about five weeks."

Case 6. (Unpublished.) Dr. B. S. Stevens, Chicago. Edward King, age 20, by occupation a laborer in a planing mill. Residence, West Pullman.

The patient entered Wesley Hospital on April 7, 1910, at 2 o'clock A. M., in a state of collapse. The history as stated by him is as follows:

At 5:30 P. M., April 6th, at the close of the day's work, the men employed in the mill were dusting the clothes of each other, using a positive pressure apparatus. While this man was bent forward some one placed the nozzle of the apparatus tightly against the anus. He states that the nozzle was not inserted into the rectum, that he was wearing his trousers at the time. He experienced a very sharp abdominal pain at the moment, felt very weak, could not stand, and was somewhat nauseated. When the patient entered the hospital he was in a state of collapse but conscious. Examination revealed the following: Temperature 96° F., pulse 190, respiration 34. Abdomen greatly distended and rigidity very marked, tympanitic. Complained of considerable pain. Could get no signs of fluid in abdominal cavity. Rectal examination was negative except for a small amount of blood.

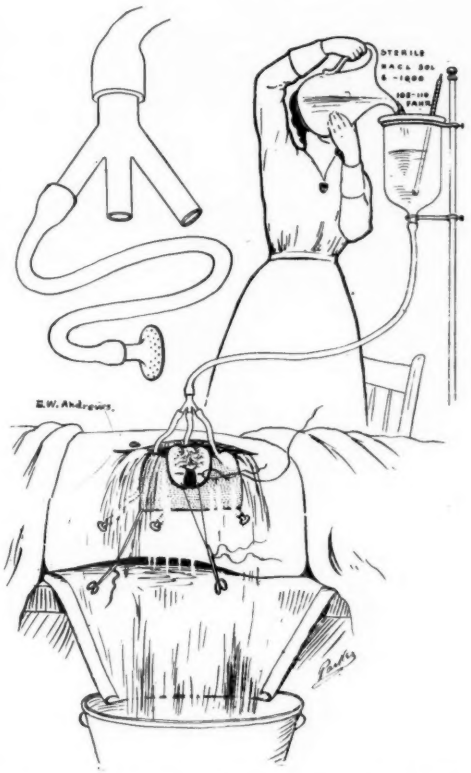


Fig. 3. Arrangement of apparatus for simultaneous cleansing and operating. Author's triple-rose nozzles for irrigating during operation.

Patient was placed on operating table, having previously been given 500 cc. of normal salt solution subcutaneously. An ether anæsthetic was administered. An incision through the external border of the left rectus revealed:

(*a*) Peritoneal cavity greatly distended with gas and some fluid present; blood stained. The intestines were greatly distended and considerably

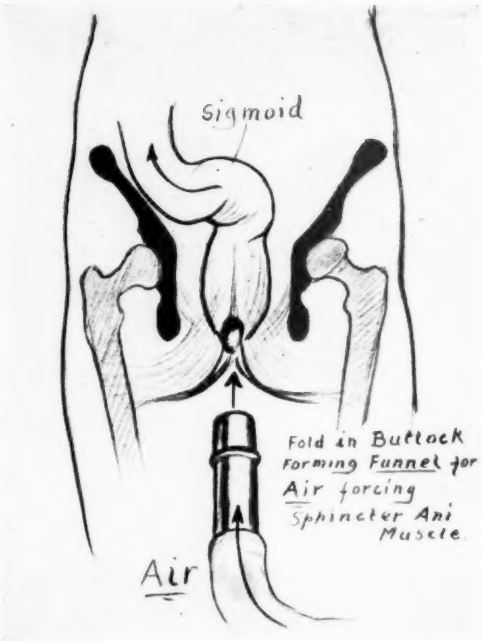


Fig. 4. Funnel formed by fold of buttocks guiding air into anus.

infected. Many large particles of hard formed feces were found in the cavity. At the splenic flexure there was a rupture of the large gut which appeared to be about one inch in diameter. This rupture was near the junction of the peritoneum and gut wall, and the lower portion of the rupture involved the parietal peritoneum at this point.

(*b*) Along the wall of the large gut, involving two or three inches of the transverse colon and the descending colon were numerous fissures involving the peritoneal covering of the gut but not the gut wall.

(*c*) Scattered over the wall of the small intestines were a number of brownish patches, having the appearance of a burn, no perforations here, however.

(*d*) The gas from the bowel or the free peritoneal cavity entered the retroperitoneal tissues through the tear in the peritoneum at the location of the rupture at the splenic flexure, dissected up the posterior parietal peritoneum and in the region of the right kidney there was found an air tumor about the size of the patient's fist. No other perforations of the gut were found.

The operation consisted in closing the rupture in the large intestine with a purse string suture of catgut followed by a Lembert, the opening in the peritoneum closed at the same time.

The patient at this time was in a very bad condition, so the peritoneal cavity was flushed with normal salt solution and the abdominal wall hurriedly closed with through and through sutures of silkworm gut.

At the close of the operation an intravenous injection of 500 cc. of normal salt solution containing 15 minims of adrenalin solution was administered, and the patient was put to bed, and one-quarter grain of morphin administered hypodermically. The pulse improved for a time, but later became almost imperceptible, and the patient died at 6 A. M.

CASE 7. (Unpublished.) Dr. W. O. Sherman of Pittsburg, commenting on this and the four other autopsies of Dr. Schilldecker, remarks: "Failure to operate in these cases was due to the moribund condition of the patient or the lack of judgment on the part of the attending doctors to diagnose the condition properly. Feces were spilled into the abdominal cavity in all four cases."

CASE 8. (Private communication.) Name of patient, Bloss Banquet, age 25, autopsy by Dr. Schilldecker, coroner's physician, showed a bruised condition about anus and no other external marks of injury. Patient was said to have been injured by injection of compressed air. Upon dissection signs of severe general peritonitis were found and the rectum (colon?) was ruptured in two places.

CASE 9. (Unpublished.) Dr. C. B. Schilldecker. Patient Charles Kaseberg, age 22, Duquesne, Pa. (Autopsy only.) Patient said to have been injured by compressed air forced against anus in sport, at the Carnegie works. Postmortem June 8, 1908. "Upon dissection and examination of the abdomen very marked evidence of severe general peritonitis was found and the lower end of the (colon?) rectum was found to be torn through for a distance of five inches. Aside from the signs of general infection the remaining vital organs were those of a normal healthy man."

CASE 10. (Unpublished.) Dr. C. B. Schilldecker. (Autopsy only.) Steven Borgan, age 25, Homestead, Pa. Patient was said to have been injured by having compressed air nozzle pressed against his body. No operation was performed and patient died of shock. Postmortem June 30, 1906, showed a large amount of feces and signs of sepsis in abdominal cavity. A ragged wound in the upper rectum three inches long showed the cause of death. There were some external bruises about the anus.

CASE 11. (Unpublished.) Dr. Wm. O. Sherman, Pittsburg, Pa. Theophilus Jaworski, aged 47, July 1, 1905. Injured by compressed air from a tube held against buttocks in sport. Signs of distension and peritonitis caused laparotomy to be performed. Sigmoid found torn, and was repaired by suturing. Patient died of general peritonitis. Autopsy showed diffusion of pus and gangrenous spots in colon.

CASE 12. (Unpublished.) Dr. Charles E. Kahlke, Chicago.

Arthur Blatter, age 20, Cook County Hospital, November 26, 1906. While employed at the Harvester Works, practical jokers among his fellows placed a nozzle of a compressed air hose outside his clothing against the hips. He felt something give way and cried out with pain and almost fainted. He was taken home, and the following day his condition became alarming, and he was taken to the hospital. Examination showed the abdomen distended and tender, pulse, 110, temperature, 102°. Laparotomy was performed at once by Dr. Kahlke, eighteen hours after the accident. A small amount of blood was present in the abdomen, but no air or feces. The colon was ruptured its entire length along the longitudinal band from the rectum to the appendix, except one or two narrow bands, but this rupture did not include the mucosa, which was intact and not perforated. The serous, muscular, and fibrous coats gaped apart the entire length of the colon from a tear one-half inch wide, except at one or two points. This enormous laceration was closed throughout its length with fine stitches, the abdomen was closed, and several drains inserted. The patient did well for five days, when, without the operator's consent, the drains were removed, and a very large tube inserted. Up to this time no marked signs of peritonitis or leakage had been shown. Afterwards gas escaped, and the patient died on the eighth day with general peritonitis. The operator thinks, quite justly, that but for this incident, recovery would have taken place.

CASE 13. (Unpublished.) Dr. Jas. Burry, Ill. Steel Co. Wojcieck Sitko was injured August 8, 1907.

A pneumatic hose, carrying the maximum pressure of 125 lbs., was held within an inch or two of his body. The air entered through the rectum, rupturing the colon in three places. The longest rupture was four inches in length, and the other two one and one-half inches in length.

The patient was admitted to the St. Elizabeth's Hospital, and an operation was performed, and the rents in the colon repaired. The patient died.

CASE 14. (Unpublished.) Dr. Jas. Burry.[1] Andy Bobba, injured Sept. 19, 1908, at the Universal Portland Cement Company's Works, at Indiana Harbor, Indiana.

While walking past some workmen, who had a steam hose, the hose was placed against his trousers, over or near the anus, and the live steam passed through his clothing, entering his rectum. This occurred at 1 P. M., and he was admitted at the South Works Hospital of the Illinois Steel Company at South Chicago, Illinois, at 3:50 P. M. At that time the abdominal walls were rigid, tense, and tympanitic, and hepatic dullness obliterated. Pulse 120. Temperature 101°. There was no surgical operation, and the patient made an uneventful recovery, being discharged from treatment September 29, 1908.

[1] The above memoranda were sent to Dr. E. W. Andrews, November 11, 1910.

Fig. 5. Forcing of sphincter by compressed air.

General observations. Compressed air is used very generally to transmit power for drills, riveters, and small tools, for cleaning cars, engines, barrels, etc., so that many large manufacturing concerns have it piped about their buildings and grounds. The air is supplied at from 40 to 125 pounds pressure, and flexible hose connections are attached to the pipe lines at various stations. So many of the above reports speak of "initiating" or "hazing" the workmen by their fellows with the air nozzle, that this form of the practical joking mania must be common. It may be that many minor or trivial accidents have happened which are not reported, but of this I can get no information.

Mechanism of the injury. In all the cases cited, the air had to pass through one or two layers of cloth to enter the anus. Yet this did not seem at all to restrain or delay its deadly work. In several cases it is stated that the nozzle was an inch or more distant and not touching the body. I feel sure that at 50 to 125 pounds pressure a gas would

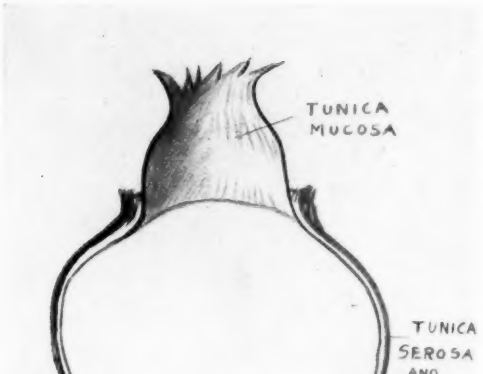


Fig. 6. Hernia of mucous membrane after mucous and fibrous coats have ruptured.

form a column several inches in advance of the tube, which would act almost like a solid body in forcing open the sphincter. One has only to hold the hand near such a nozzle to realize the tremendous impact of the blast. Just as the jet of a fountain can be made to sustain a ball of some weight, so the jet of air is more than ample at several inches to force the levator and sphincter ani muscles and soft pelvic floor. The pelvic floor and nates form, in fact, a funnel whose apex is the anus. The confined air expanding in this funnel will force the gut open without having the end of the pipe accurately adjusted to the anus. With the involuntary contraction of the levator and sphincter muscles the space between the buttocks would be narrowed and the funnel deepened, thus confining the escaping air laterally and leading it the more quickly into the bowel.

Pressure required to rupture an intestine. With an air-pressure gauge and tank of compressed air, it is easy to show that the ordinary bursting point in a dog or ox intestine is from 6 to 10 pounds. The human intestine shows about the same bursting point when removed from the body. Whether the strength would be greater in the living body, we do not know, but probably there would be a slight difference. I have tested numerous specimens of stomach, bladder, and intestines obtained at meat shops and from dog experiments, and have never found one capable of bearing over 12½ pounds, most fresh specimens bursting at about 7 or 8 pounds. Senn, experimenting on the cadaver of a case of enteritis, found that the diseased bowel ruptured at 1½ pounds. A very interesting chapter might be written on the dangers and accidents of forced enemata and bladder injections, but this paper is not concerned with that type of rupture.

Symptoms and pathology. Several of the reports speak of minor bruises about the anus, but in most the injuries are internal and concealed. It is notable that no case has been diagnosed without a history, most of them being treated as "colic." This is no more than is true of traumatic rupture of the bowel from blows, in which a diagnosis could not be made early on objective signs only.

I believe this can now be changed in the light of this report, and that we can make a correct diagnosis, even with the absence of history, as when the patient is unconscious, or, as happens occasionally, he cannot speak any of the more common languages of Western Europe. I can think of no other injury or disease which could produce the tense air-filled peritoneal cavity, pressure on the diaphragm, and often emphysema of tissues, without signs of inflammation, except this air injection. The differential diagnosis would be from ileus perforation, by ulcer, or wounds, fractures of the rib, or injuries of the air passages, causing emphysema. The fact that the air is in the peritoneum, not in the bowel, could probably be determined with certainty. I think, if I saw another case of the kind I have reported, I should know at a glance what had happened. Secondary symptoms due to advancing peritonitis should never be waited for. As in rupture of intestine from blows, the earliest possible exploration should be made equally for diagnosis and treatment.

It should be remembered that we do no harm if we open the belly and find it normal, but the opposite mistake, omitting the exploration, may cause a death.

Pathology at operation and autopsy. The colon has been the viscus torn in every recorded case. In most of them the rupture was in the sigmoid. In several it was multiple. In my own case, Dr. Kahlke's, and Dr. Fletcher's, a characteristic feature was the splitting or tearing of the outer coats of the bowel, allowing the mucosa to protrude. This was much less widely torn. Dr. Kahlke's case was unique, in that the mucous coat was not ruptured at all, and from the extraordinary extent of the tear in the outer coats, i. e., the whole length of the colon.

The rectum and anus escape much injury because of their outside support. The sigmoid tears probably because it is first to receive and confine the blast of inrushing air. The wide loop of the sigmoid flexure probably traps the air momentarily by its somewhat bent or kinked junction to the descending colon. It thus sustains the first shock of the diastatic pressure, and, unable to pass the mass of air onward, it yields to the pressure, dilates, and bursts into the free peritoneal cavity. It is probable that the sigmoid is as strong as the rest of the bowel and would not yield first if the air pressure were more gradually introduced. In testing the intestine with the air pump and gauge, the rupture often takes place in the mesenteric border, but in all the cases here reported, except Dr. Steven's, it is reported as occurring at the longitudinal band, if mentioned at all.

Mortality and prognosis. The mortality in the above cases was 13 or 81.2 per cent, but this is largely increased by the fact that no operation was done in most of them. Of the seven cases treated by laparotomy, four died, or 57.2 per cent. Of nine cases not operated, all died, or 100 per cent. If all cases could be brought to early operation the mortality would be lower, 10 to 25 per cent.

Treatment. It seems useless to speak of palliative treatment; yet palliation of the one symptom of air pressure by puncture did resuscitate my case, and enabled me later to do a laparotomy. Ambulance surgeons, or those giving first aid, should be instructed, if great dyspnœa is a factor, to make an emergency tapping with a hollow needle, or even a small bistoury. Regular laparotomy should be performed as soon as possible. Unlike wounds and ruptures of the bowel, no time need be lost in exploring for the injury. In nearly every case reported, it has been in the sigmoid or rectum — usually the most movable and easily handled part of the intestine, and the easiest found. In Dr. Fletcher's case, however, the rectum was torn so deeply in the pelvis that he found it difficult to insert his stitches.

It is possible that in bad surroundings, or with an exhausted patient, it might save time, and even the patient's life to bring the torn bowel into the wound as an artificial anus. More commonly we would be justified in completing the repair at once. My own practice in intestinal surgery has been to resect a loop of bowel with several perforations near together rather than close them individually. In Boughton's and Dr. Fletcher's cases the torn gut was reunited, and a good result obtained. In Fletcher's case, however, a narrowing or stricture was produced, necessitating first a colostomy, and later a resection of that portion narrowed.

NOTE. (Case 15.) Dr. Godfrey's case reported verbally at the meeting is described in the following letter just received:

Dear Doctor Andrews: Pardon my delay in sending this report, but the fact that at the factory the victim was known as John Chinko, while the coroner's certificate was filed as John Zinska, led me to considerable difficulty in getting at the facts.

John Zinska, aged 19, had the nozzle of a compressed air tube, with pressure of 80 pounds inserted into the anus, at about 5 o'clock P. M. October 28, 1908. He was taken to his home and seen by Dr. J. Murray Johnson, who did not find his condition serious, although patient had much pain. The next morning he became very much worse, and was sent to St. Vincent's Hospital, but died on the way there. The coroner's medical examiner, Dr. F. B. Downs, found death due to rupture of large intestine. I examined the specimen which he removed yesterday (December 17, 1910) and found a small rupture about one-fourth inch in diameter, at about the upper end of the sigmoid flexure, with extravasation of blood into the tissues below. Very truly yours,

CHARLES C. GODFREY, M. D.

Bridgeport, Conn., Dec. 18, 1910.

CONCLUSIONS

1. The use of compressed air is almost universal in certain modern industries.

2. A warning should be published against the dangers of practical joking or hazing with the air nozzle or even the careless use in dusting clothing.

3. The column of air, rushing from the nozzle which does not touch the body, may enter the bowel and cause fatal injury.

4. Diagnosis of this accident can be made in future cases from physical signs without history.

5. The sigmoid colon is the viscus usually burst.

6. Prompt evacuation of the air by emergency puncture and early laparotomy offer the only chance of saving life after this injury.

A MALIGNANT LYMPHOMA OF THE SMALL INTESTINE

Partial Intestinal Obstruction; Resection of the Intestine Containing the Tumor; Recovery; Subsequent History

By CHARLES L. SCUDDER, M. D., Boston, Massachusetts
Surgeon to the Massachusetts General Hospital; Lecturer on Surgery at the Harvard Medical School

M. Z., an Italian woman, 37 years old. Married. For several years the patient has had attacks of abdominal pain located in the epigastrium accompanied with vomiting. Occasionally she has had, after the vomiting attack, chills with fever. The bowels have been somewhat constipated. She has lost some weight recently. Some twenty years ago, soon after her marriage, she had syphilis.

Inspection finds a well developed and well nourished Italian woman with several enlarged glands in the neck behind the sternomastoid muscles. The heart and lungs are negative. The liver, the right kidney, and the spleen were all palpable below the costal margin, but were not enlarged. In the right lower quadrant of the abdomen was a freely movable, tender mass the size of an egg, easily palpable. Intestinal peristalsis was very evident in the neighborhood of this mass and the mass was observed to appear and disappear.

Operation laparotomy. A coil of small intestine

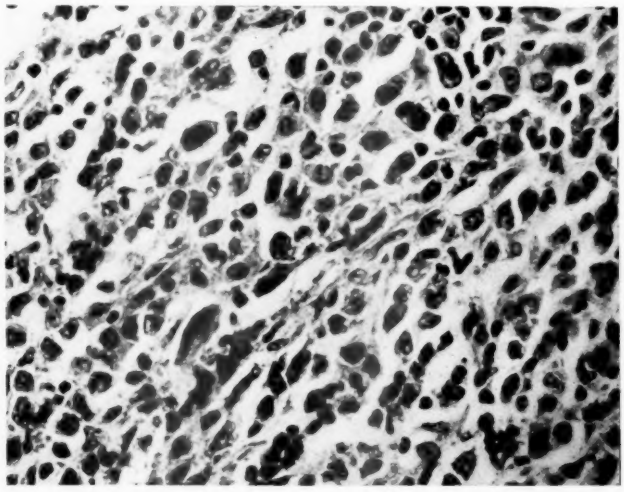


Fig. 1. Photomicrograph of the tumor of small intestine showing a tissue rich in cells of the lymphocyte series, with here and there a larger reticulum cell.

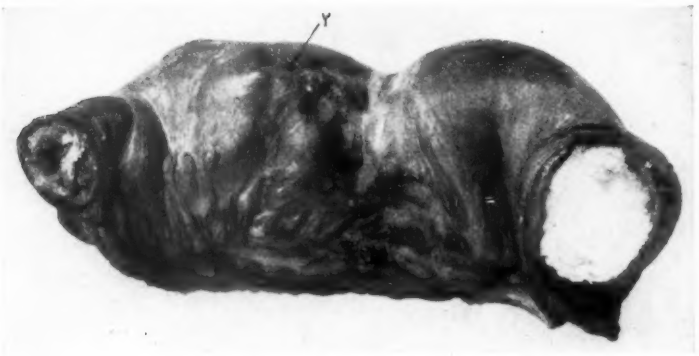


Fig. 2. Lymphoma of the small intestine. The portion of the intestine containing the tumor "Y."

was found near the uterus containing a hard elongated tumor, the whole mass being about two inches by four inches in size. The lumen of the proximal portion of the intestine was dilated and its wall hypertrophied; the portion of the intestine distal to the tumor appeared normal. The tumor was resected and a lateral intestinal anastomosis done.

The pathological report from the Clinico Pathological Laboratory of the hospital was as follows:

The specimen is a piece of small intestine about 18 cm. long. Over a length of about 11 cm. the wall throughout the circumference is transformed into a tumor mass in places 2.5 cm. or more in thickness. On section the tumor consists of a firm grayish white tissue with a smooth or slightly trabeculated cut surface. The lumen of the intestine is practically occluded by the tumor. The portion of intestine at one extremity of the specimen and immediately adjacent to the tumor is greatly dilated.

Microscopical examination of sections from the tumor shows a very cellular tissue with a generally small amount of stroma. The cells are, for the most part, various forms of lymphocytes, but scattered among them are larger cells with vesicular nuclei, which are regarded as atypical forms of the reticular cells of lymphadenoid tissue. A few of these cells are large enough to be called giant cells.

In brief the tumor consists of atypical lymphadenoid tissue, probably originating from the lymphadenoid tissue of the part. It may be called a malignant lymphoma or a lymphosarcoma. Signed, J. H. Wright, Director Pathological Laboratory, Massachusetts General Hospital.

Convalescence following the operation was uneventful. The patient left the hospital four weeks after entrance.

One year later the patient re-entered the

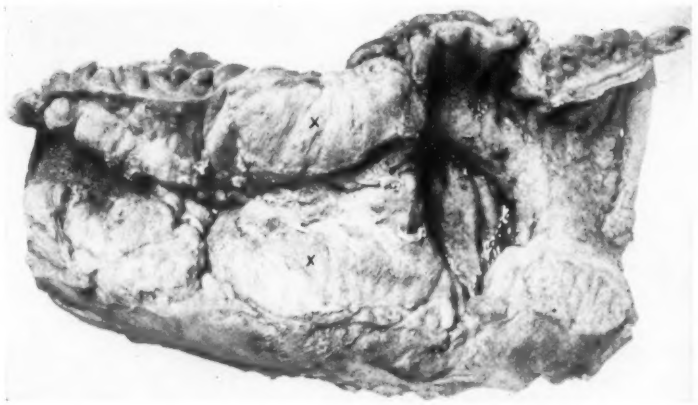


Fig. 3. Lymphoma of the small intestine. A view of the interior of the intestine, showing the cut surface of the obstructing tumor "X."

hospital on the medical service, complaining of vague and indefinite pains throughout the body, and with several masses to be felt in the abdomen, not seated near the cicatrix. The blood count showed, hemoglobin, eighty per cent; white count, 11,000; polymorphous cells, 42 per cent; lymphocytes, 17 per cent; large mononuclears, 35 per cent; transitionals, 5 per cent; eosinophiles, 0 per cent; mast cells, 8 per cent. The urine was normal. She was given Fowler's solution, and after three weeks left the hospital, very much improved both in general appearance and symptomatically.

THE ROUX OPERATION IN DILATATION OF THE STOMACH

By R. E. BALCH, M. D., Kalamazoo, Michigan

IT is a fact that many surgeons have abandoned gastroenterostomy in cases of gastric dilatation, believing that the results are not such as to warrant even the slight risk of a clean laparotomy. A study of the cases operated upon by myself and my colleagues in connection with the X-ray work of Dr. A. W. Crane has convinced me that the posterior no-loop operation is far from being the ideal operation for the majority of these cases. Dr. Crane has shown in his large series of skiagrams of the stomach, that the most common form of dilatation is really an elongation of the stomach with a prolapse of both greater and lesser curvature with the pylorus and esophagus as fixed points, giving what he calls a drain-trap stomach (Fig. 1). It is this type of dilatation, too, that gives the most marked clinical symptoms due to the inability of the stomach to empty itself; and it is this form of stomach above all others that demands drainage at its most dependent portion, and this portion of the stomach is frequently resting in the true pelvis (Fig. 2).

Now if we make an anastomosis between this lowest part of the stomach and the beginning of the jejunum as it emerges from the mesocolon, it means that the greater curvature must be raised in the abdomen to the ligament of Treitz, which being a relatively fixed point, suspends the dilated stomach at the point of anastomosis. In cases of only moderate elongation, or globular enlargement, this may give very good results, but in the usual type of severe cases, the condition is not relieved, as the weight of the stomach dragging upon this point of anastomosis will cause a closure of the opening, either by kinking of the jejunum if a short loop has been left, or if no loop, by a partial anterior revolution of the stomach as it falls forward and downward, thus bringing the anastomosis practically on the upper wall and too high up for good drainage. If either of these complications follow, we have not only failed to cure our patient, but have in all probability left him in a worse condition than he was previous to the operation.

Another form of dilatation calling for something other than the posterior no-loop gastroenterostomy is that type of stomach in which we find the pyloric end of the stomach greatly dilated and displaced far to the right (Fig. 4).

Before a gastric case comes to the operating table, we should have as accurate a picture of the intra-abdominal organs as possible, especially the position, shape, and size of the stomach. All who have had much experience in stomach surgery will admit the difficulty of obtaining an accurate conception of the actual position and shape of the stomach through a laparotomy incision. Good skiagraphs will show us at once not only the size and shape of the stomach, but the position in which the organ naturally lies, thus enabling us to decide what operative method is best suited to the case in hand.

Lack of satisfactory results following gastroenterostomy in cases of severe dilatation with prolapse, compared to the good results in cases of globular dilatation, called plainly for more

Fig. 1. Skiagraph immediately following bismuth meal, patient prone upon the abdomen: pylorus partially prolapsed, greater curvature below the crest of the ilium. With patient in upright position the greater curvature would fall about three inches lower. Consider distortion and traction if greater curvature were suspended posteriorly at level of umbilicus (U).

Fig. 2. Distension and prolapse more marked than in Fig. 1. Distortion would be still more marked if suspended at the height of the umbilicus as the prolapse is greater and the weight of the dilated stomach would be greater than in Fig. 1.

perfect drainage, and this led me to the trial of the Roux operation, or the anastomosis *en* "Y."

The advantages of this method are: first, that a point in the jejunum can be chosen that will anastomose with the most dependent portion of the prolapsed stomach with no traction upon the point of anastomosis. Second, when the stomach contracts, as it nearly always will after proper drainage, the point of anastomosis can rise in the abdomen with it and there will still be no kinking. Third, the bile and pancreatic secretions are discharged into the jejunum several inches below the point of anastomosis. Fourth, if necessary, owing to dense adhesions between the stomach and pancreas, an anterior gastroenterostomy can be performed by the same method.

The disadvantages are: first, ten to fifteen minutes more time are required; second, a limit to the size of the opening from the stomach to the bowel. The first objection is without importance, as the operation rarely takes over sixty minutes. The second disadvantage can be overcome by using care in placing the stitches so that a very narrow margin of sero-serous approximation is formed, thus avoiding a valve formation.

The technique of the operation varies with the individual case. The incision in most of the cases should be made through the left rectus, and not through the right as is usually done. The advantage of this can be readily seen by reference to the accompanying skiagrams Nos. 1, 2, and 3. In the majority of cases of dilated stomach the organ lies well to the left of the median line, and any examination or operative procedure can best be carried out through an opening over the organ in question.

The lowest point of the stomach having been previously determined by a skiagram or screen with the patient standing upright, a loop of the intestine is brought out and its point of emergence from the mesocolon located. The distance from this point to the point chosen for anastomosis should be great enough to allow the loop to extend at least to the level of the lowest border of the greater curvature. This point will depend not only upon the extent of the prolapse of the

Fig. 3. Prolapse of greater and lesser curvature and also prolapse of pylorus. A posterior no-loop operation in a case of this kind will give much better results than in Figs. 1 and 2, as the pylorus being low there would be a double point of drainage, provided the pylorus was still patent.

Fig. 4. Shows a frequent type of dilatation in which the pyloric end is displaced far to the right and dilated. Drawing this lowest point across to the left side to the ligament of Treitz, would produce both traction and distortion.

stomach, but also upon the length of the mesentery of the intestine, and may vary from eight to twenty inches. The lowest point of the greater curvature having been located, an opening is made through the mesocolon, and a large area of the stomach at this lowest point is picked up and closed off from the rest of the organ by rubber guarded clamps. The loop of the intestine that has been chosen for anastomosis is also closed off by protected clamps, walled off by wet sponges, and cut completely through, the separation being carried down to the base of the mesentery. The usual anastomosis *en* "Y" is then carried out, the distal end being sutured to the point chosen in the greater curvature of the stomach, and the proximal end sutured as far down on the distal end as the length of the separated mesentery will allow. This point is important, for as we increase the distance between the enteroenterostomy and the gastroenterostomy, we lessen even the possibility of regurgitant vomiting.

The results following this operation in cases of severe dilatation or prolapse have been far more satisfactory in the hands of the writer, than the posterior no-loop operation.

DEPARTMENT OF TECHNIQUE

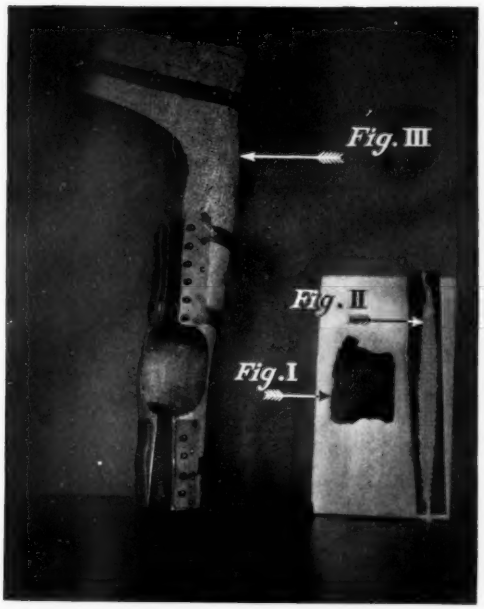
NON-INFLAMMABLE CELLULOID SPLINTS AND BRACES

By WALTER G. STERN, B. S., M. D., Cleveland, Ohio
Fellow of the American Orthopedic Association; Orthopedic Surgeon to the Mt. Sinai Hospital

THE ease and cheapness with which celluloid splints, jackets, and braces can be made by the physician or surgeon possessing little or no mechanical skill, should certainly recommend this form of orthopedic apparatus to the profession at large, and free him from the thraldom of the bracemaker and surgical supply houses, into whose hands most of these cases eventually fall for diagnosis and treatment. The fear of fire has no doubt deterred many who might otherwise have made use of this technique, and it is to obviate this that the following paragraphs are written.

Celluloid can be made slow burning — as slow burning as woolen clothing — and above all not to "flash" in the presence of a flame, by the addition of perchloride of iron to the usual solution of celluloid in acetone. Sufficient iron will even prevent the celluloid from catching fire, as is seen in Fig. 1, but in practice only enough is added to give the celluloid a dark straw color, which renders it slow burning and prevents it from flashing.

Such celluloid splints can be best made as follows: The part for which the splint is intended is greased with vaseline and a strand of picture wire laid upon it lengthways, then a plaster bandage is smoothly applied, and when hardened it is opened lengthwise by cutting down over the strand of wire. Cross markings are made on the mold to show where it is to come together; it is removed and the cut edges and one end sealed by wrapping about circular turns of a fresh plaster bandage. The inside of the mold is now wet with a pail of soap water, drained, and filled with thin, smooth plaster cream. When the cast is hard the mold is cut open and removed; all irregular projections of the cast model cut off with a knife, all holes plugged up with plaster, and the whole model made smooth and slightly larger by smearing it all over with handfuls of plaster cream. It is then set in a warm place to dry, and in 24 hours can be glazed with two coats of sodium silicate, which prevents the celluloid from adhering to the plaster. Paint, varnish, or shellac will unfortunately not do, as they are dissolved by the acetone. After the sodium silicate is dry the cast is covered with the fabric to be used in the celluloid splint. Some workers use stockinet bandage material, others ladies' stockings or gauze undervests and the like. I prefer the triple weave incandescent gas mantle fabric (Fig. 2) which can be obtained as culls or seconds from any gas mantle factory. It has a more open mesh, is thicker on account of its triple weave, and takes up more celluloid. The fabric is impregnated by being painted with a solution of celluloid in acetone of about the thickness of honey; the painting is best done with a metal handled glue brush. After five to ten coats the fabric will be well impregnated and



the surface smooth. Another layer of fabric is now drawn over the cast and impregnated with celluloid. I find six layers of fabric sufficient. The inner and outer layers of fabric should be painted with celluloid containing *no* perchloride of iron to avoid staining the clothing. The splint is trimmed off with a knife to the shape desired and is thoroughly dried in a warm place for at least 24 hours and is then opened and removed from the cast.

It now goes to a harnessmaker to rivet on the soft leather fly and the lacing eyelets along the edges. If one wishes to strengthen the splint for extra heavy use or abuse, it can be reinforced with strips of hoop steel one-half inch wide, 16 gauge. Fig. 3 represents a reinforced splint intended for the after treatment of a case of tuberculous hip disease. The body of the splint is of iron celluloid painted on triple weave gas mantle fabric, the reinforcing bands of hoop steel were shaped and drilled by a blacksmith who had never handled such work before, and the leather work made and the steels riveted on by a harnessmaker. The body of the splint may also by punched full of one-half inch holes for ventilation.

NOTE.— The price of ordinary commercial acetone should not be more than 18 to 20 cents per pound, or $1.00 per gallon at any place east of Salt Lake City, while scrap celluloid may be procured from automobile top factories or garages for 25 to 50 cents per pound.

FINISHING THE BUTTONHOLE STITCH

BY J. J. BUCHANAN, M. D., PITTSBURGH, PENNSYLVANIA

THE method of inserting the last of a series of buttonhole stitches *in the reverse direction* from the others to facilitate the tying of the knot is a method which may be in use by other surgeons but has never been observed by the writer.

I here present the method I have used in doing this.

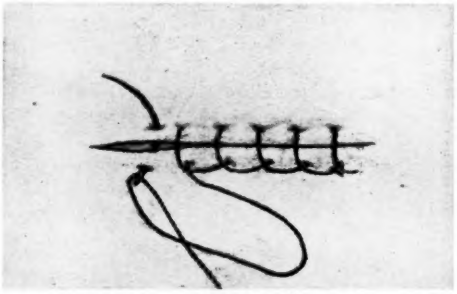


Fig. 2. Final stitch inserted *from* the operator.

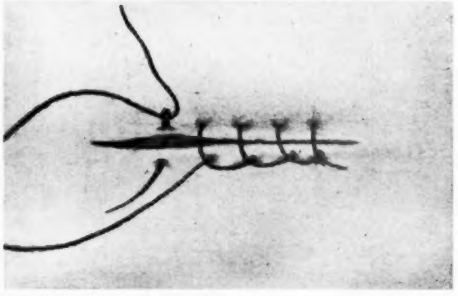


Fig. 1. Stitches in continuity inserted *toward* the operator.

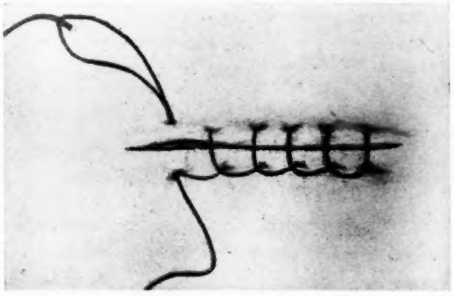


Fig. 3. Last stitch ready to tie.

BONE WIRING WITH A NEW MATERIAL OF GREAT TENSILE STRENGTH

By J. SCHWINN, M. D., Wheeling, West Virginia

EVERY surgeon engaged in bone work knows the disappointments of wiring with silver wire or aluminum copper wire. Just at the moment when the last turn is made the wire often snaps and the whole procedure has to be repeated.

I have, during the past four years, used common picture wire, which consists of some ten thin threads of common wire, braided into a cord of extraordinary tensile strength, impossible to break and capable of being twisted almost ad libitum, thus permitting of the closest approximation of the fragments without fear of breaking.

For a drill I use a common small hand drill of the egg beater pattern, with a round point instead of a flat one, thus obtaining a clean-cut round hole instead of a slit-like ragged one. This drill, with points of different sizes, can be purchased from any hardware store for very little money, and will be found far superior to the ones commonly used by surgeons. Thus the use of picture wire and a drill of the above description insures great safety in twisting, and saves considerable time on account of the easy and rapid introduction of the wire.

In former years I used to leave the wire in, cutting it short at the time of operation, but lately I leave it long whenever feasible, in order to give it an extra twist whenever it is advisable; and after union is effected, it can easily be untwisted and removed in the first stage of anæsthesia.

AN IMPROVED TECHNIQUE IN GOITER OPERATIONS[1]

By JOHN R. WATHEN, A. B., M. D., Louisville, Kentucky
Professor of Surgery and Clinical Surgery in University of Louisville; Surgeon to St. Anthony's Hospital, Louisville City Hospital, and University Hospital

WHILE much attention has been given to the pathological and clinical aspects of goiter in its various forms, but few changes have been made in the original operative technique as has long been practised by Kochers and others.

The method of operation, as illustrated by the accompanying photographs, has for its recommendation simplicity, rapidity, and safety, the three most desirable points in technique.

It has been based upon an experience of 142 operations for the different types of goiter, with no case of injury to the recurrent laryngeal nerves or any clinical evidence of injury to the parathyroids.

The use of the scissors has replaced entirely the knife, and all the structures, beginning with the skin, and later the enlarged thyroid gland, are elevated and approached from the under surface. This lessens the hæmorrhage by placing the parts on the stretch, makes the work more rapid and safer, and allows of easier blunt dissections to be made.

The neck is opened, as shown (Fig. 3), by pinching up the skin with the fingers and making a small cut through the skin and the platysma. The cut surfaces are now grasped by volsellum forceps and traction is made upward, next blunt pointed, curved scissors are used as a dissector (Fig. 4), and the skin with the attached platysma are rapidly separated from the muscles below and then cut along the curved line used by the Kochers (Fig. 5).

By continuing the upward traction the two large skin flaps are dissected up to the hyoid bone above and to the sternum below (Fig. 6).

The ribbon muscles are now separated in the middle line and clamped high up and cut on one or both sides when needed, as has been suggested and practised by C. H. Mayo (Fig. 7).

The fibrous and the true capsule over the goiter is next opened, and with a large pair of volsellum forceps the enlarged lobe is elevated and traction is made in an upward direction and to the opposite side of the neck (Fig. 9). This readily allows the capsule to be dissected downward and places the blood-vessels to be ligated on the stretch, causing less venous hæmorrhage,

[1] Read before the Southern Surgical and Gynecological Association, Nashville, Tennessee, December 13–15, 1910.

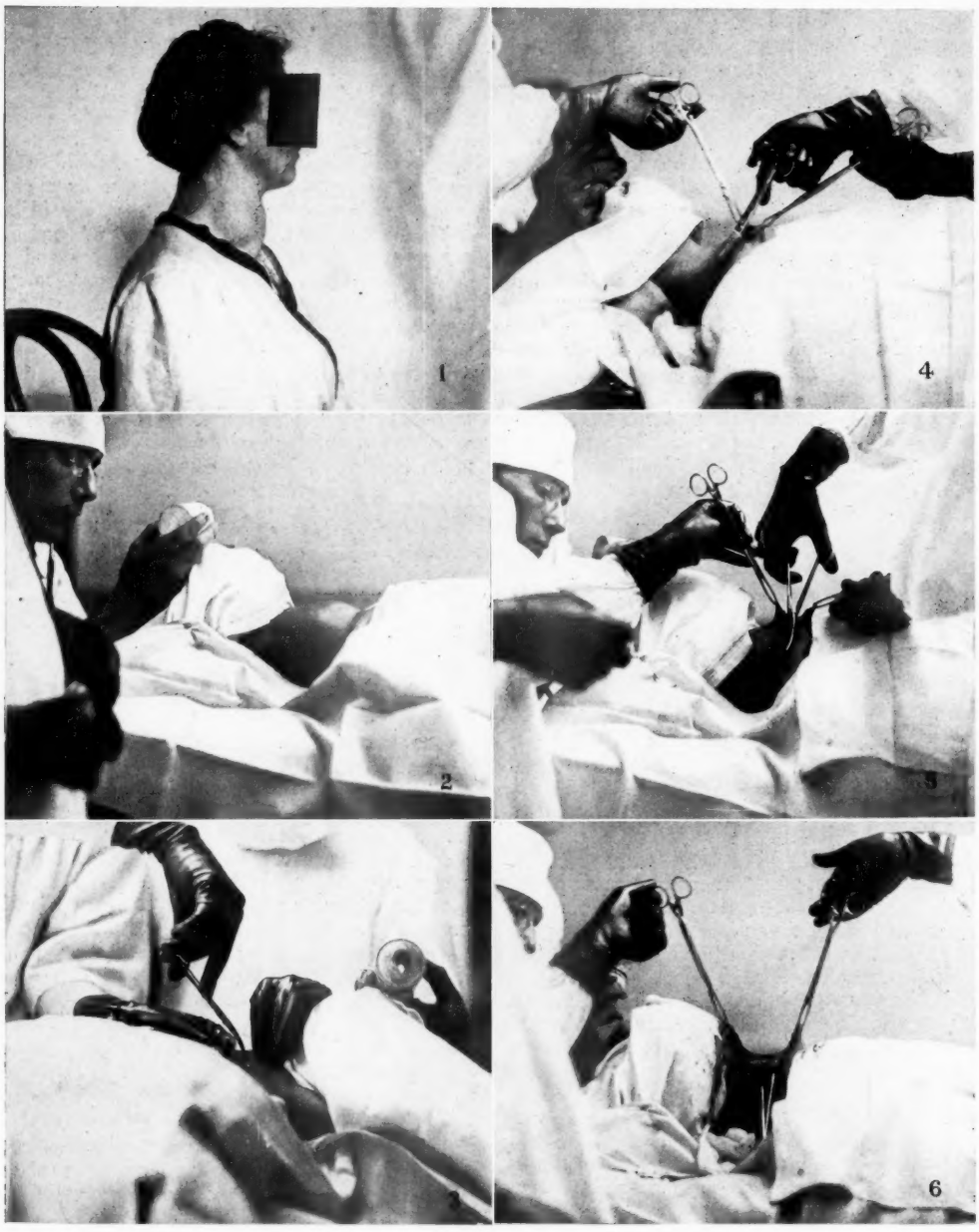


Fig. 1. Goiter before the operation.
Fig. 2. Prepared for the operation.
Fig. 3. Making the incision with the scissors.
Fig. 4. Elevating the skin and separating with the scissors as a dissector.
Fig. 5. Cutting the skin and the platysma.
Fig. 6. Sternomastoid and sternohyoid muscles exposed.

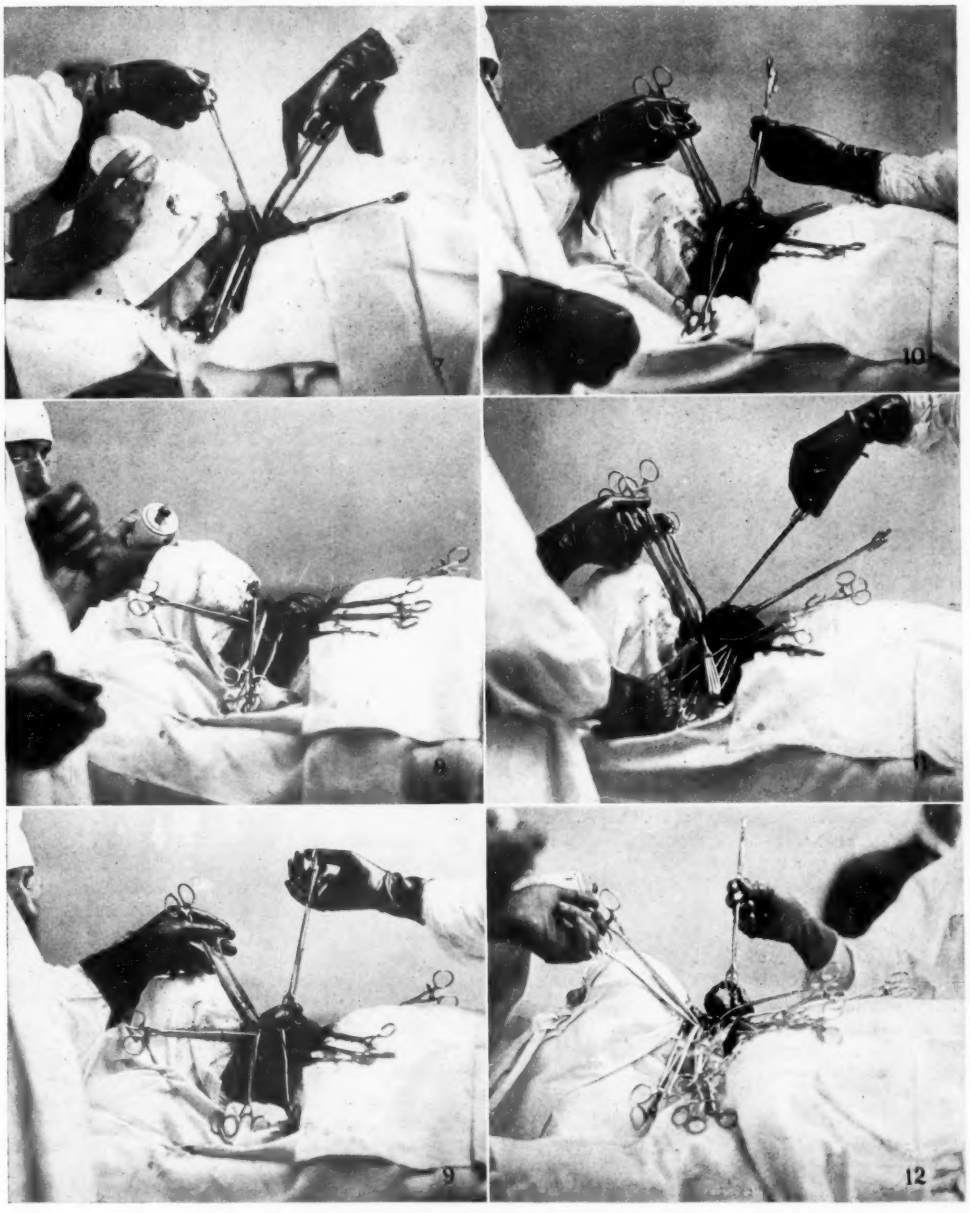


Fig. 7. Cutting sternohyoid and sternothyroid muscles between clamps.
Fig. 8. Goiter under capsule.
Fig. 9. Goiter elevated and capsule dissected downward.
Fig. 10. Inferior thyroid vessels exposed ready for ligation, within the capsule.
Fig. 11. Superior thyroid vessels exposed.
Fig. 12. Goiter remaining attached only by the isthmus.

and relieves the trachea of pressure from the weight of the tumor.

The vessels can now be clamped as the elevated goiter lifts them away from the surface of the capsule (Figs. 10 and 11). The capsule adherent to the posterior structures is thus separated from the vessels and there is no danger of the nerve being included with the vessels or any danger of injuring the parathyroids. Occasionally when the enlarged lobe extends high up in the neck, it is better to place a second small volsellum forceps on the upper part and make traction upward and downward to better expose the superior thyroid artery and vein.

This constant upward traction on the tumor allows it to be rapidly dissected from the posterior structures and only held by the isthmus of the gland. A large clamp crushes this part, which can be sutured over.

The capsule, muscles, and skin are now closed in the usual way and drainage provided through a stab wound in the lower flap.

This technique differs from that of others in that it does not employ the knife, which is dangerous in neck surgery, it cuts the skin and superficial structures, only after they have been elevated and dissected up from below, and it grasps the goiter with volsellum forceps and elevates it away from the dangerous area underneath.

This constant traction causes much less hæmorrhage and allows of a rapid operation, within plain view of the surgeon. It is surprising how few forceps are used when the venous hæmorrhage is thus controlled.

THROMBOSIS POSTABORTUM; EXCISION OF THE THROMBOSED LEFT OVARIAN VEIN; HYSTERECTOMY; DEATH FROM CONTINUED THROMBOPHLEBITIS

By ROBERT T. FRANK, A. M., M. D., New York City, New York
Assistant Adjunct Gynecologist, Mount Sinai Hospital

THE value of ligations of the pelvic veins for puerperal thrombophlebitis has not been definitely settled. A large number of cases must be subjected to critical review before we can hope to determine whether operative interference is justified. With the view of contributing to these statistics the following case is reported.

C. P. was admitted to Mount Sinai Hospital to the gynecological service of Dr. Brettauer, on July 6, 1910. The patient was 32 years old, married 10 years, had borne four children, the last one three years ago. Since her last pregnancy the patient had aborted six times. The menstrual history was normal. Last menstruation occurred three months previous to admission.

Two and one-half weeks before reception in the hospital the patient again aborted spontaneously at about the third month. A few hours later the uterus was packed by a physician on account of hæmorrhage. Three days after abortion she was curetted. The operation was promptly followed by a chill and fever to 104°. For three days the temperature then remained normal, but on the fourth day a renewed rise was noted. The patient was, thereupon, again curetted. The next day she had one chill, the day following, two. For the succeeding days fever, followed by profuse sweating, but no chills were noted.

On admission the general condition was fair, anemia well marked, the tongue dry and coated. There was a soft blowing systolic murmur over the heart's apex. The abdomen was soft, lax, and tympanitic. The spleen was palpable two fingers' breadth below the free border of the ribs. Vaginal examination disclosed a slightly enlarged, retroverted uterus, which was movable. The adnexa were not diseased. A cystic swelling was felt along the right vaginal wall, immediately beneath the mucosa, with slight infiltration, extending into the base of the right broad ligament. This cystic mass apparently ruptured soon after, for on the next day it could no longer be felt, and considerable purulent discharge, previously wanting, was noted.

The temperature was 104°, soon rising to 106.8°.

The patient was observed for four days, during which time she had numerous chills. On July 9th the w. b. c. was 19,700, polynuclear count 90 per cent, on July 11th w. b. c. 14,500, polynuclear 92 per cent. On the fourth day the temperature reached 108°. The course of the

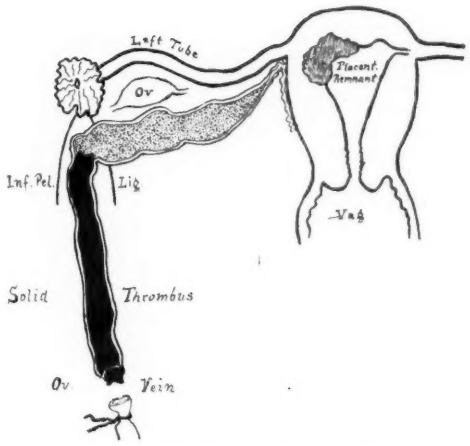


Fig. 1. Findings at operation.

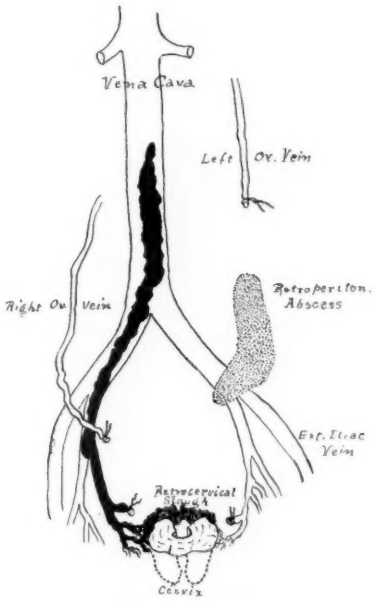


Fig. 2. Autopsy.

disease was subacute (three weeks since abortion), the blood cultures remained negative, chills recurred with monotonous regularity, and peritoneal symptoms were entirely absent. Under these conditions operation appeared to offer the only hope, although intervention at such a late date hardly seemed promising.

On the fifth day after admission, with the kind assistance of Dr. Vineberg, I undertook the operation as a last resort.

Operation, July 11, 1910. *Supravaginal hysterectomy and double salpingo-oöphorectomy. Ligation and excision of left ovarian vein. Vaginal drainage.* Time 56 minutes; gas and ether anæsthesia. Five inch median incision; no peritoneal changes. The uterus was found enlarged and soft. On the left side the entire broad ligament, extending outward from the uterus, was thickened, tense, and shiny. The normal tube was situated upon the apex of the swollen ligament. Extending upward, retroperitoneally, behind the sigmoid, was a palpable indurated strand. The peritoneum between the left pelvic wall and the sigmoid was divided. This permitted the ovarian vein to be isolated far upward. A ligature was passed around the vessels above the diseased area. As the vein was cut across, a portion of a red thrombus extruded from the peripheral end. Grasping the vein it was readily freed downward toward the uterus. About two and one-half inches below the line of section, the red thrombus ended, and the distended vein lumen was found filled with greenish pus. This pus cavity was accidentally opened. The entire broad ligament containing vein and tube were amputated close to the uterus. As the uterus did not look normal and the deeper veins could not be properly seen, a hysterectomy was decided upon. A rapid supravaginal hysterectomy was performed. The cervix was split posteriorly and a few sutures passed for hæmostasis. Two strips of gauze were led out into the vagina and used to cover the raw bases of the broad ligaments and the bed of the left ovarian vein. No thromboses or changes in the other pelvic veins, which became accessible after removal of the uterus, were found. Layer suture of the abdominal wall.

Specimen. The uterus was enlarged and soft. The mucosa appeared sloughy. At the left tubal opening a piece of placental tissue was adherent. The thrombosis began in this region. The left ovarian vein was surrounded by inflammatory tissue. The appendages were normal. (Fig. 1.)

Pathological report. Clot, presence, or absence of bacteria not determined, owing to poor fixation of the tissues. Uterus showed diffuse metritis, purulent inflammation of broad ligament with purulent inflammation in veins. No growth from pus or from clot in vessels of uterus.

The patient bore the operation without shock, and no abdominal symptoms, referable to the in-

tervention, were noted subsequently. For two days the temperature was somewhat lower, and then again rose. On the fourth day a chill took place, and thereafter chills recurred almost daily until death, fourteen days later. No metastatic foci could be determined by physical signs, and three blood cultures remained sterile.

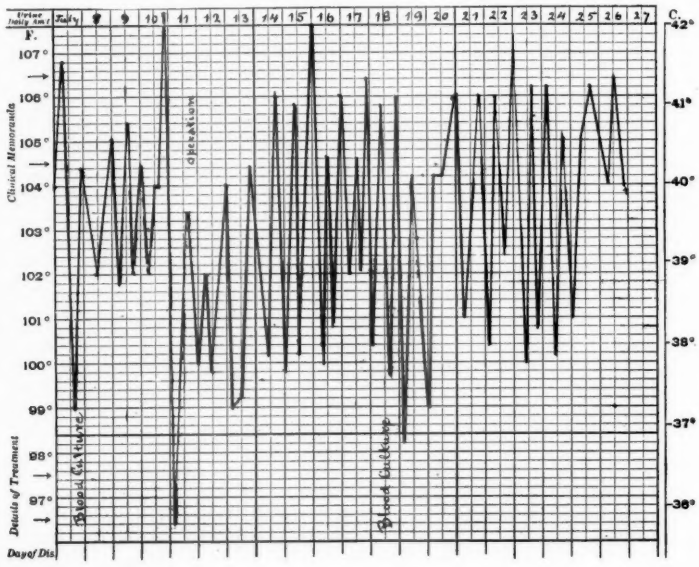
Autopsy. Abstract of autopsy performed 18 hours postmortem by Dr. A. E. Cohn.

Lungs. In the middle portion of the right lower lobe is a triangular necrotic area. A similar area with cavity formation is present near the hilus. The left lobe shows similar lesions.

Veins and pelvic tissues. At the brim of the pelvis to the left of the sigmoid flexure, and retroperitoneal, there is an abscess 10 cm. by 4 cm. from which there escaped 10 to 20 cc. of thick greenish yellow pus. The sigmoid was adherent to the drained area at the base of the broad ligament, the tissue of which is gangrenous. Behind the amputated stump of the cervix the tissues look gangrenous. From the perivaginal tissue thrombi can be traced into the right internal iliac vein, extending into the inferior vena cava to a point below the level of the renal vein. The thrombus is adherent to the vein wall, in some spots lying lead pencil like in the lumen, in other spots forming a greenish grumous mass. The right ovarian vein is thrombosed. (Fig. 2.)

Diagnosis. Suppurative thrombosis of the right vaginal, right internal iliac veins and inferior vena cava, retroperitoneal abscess, metastatic necroses of the lung, parenchymatous degeneration of liver and kidneys.

Epicrisis. The origin of the infection in the above case can be traced directly to intrauterine manipulations during the packing of the uterus for hæmorrhage, or during the subsequent two curettages. In spite of repeated curetting a remnant of placenta remained at the left tubal angle. When admitted to the hospital two and one-half weeks after abortion, thrombosis had already occurred in the left ovarian vein. Possibly small thrombi, not perceptible during operation, were then present in the small tributaries which arise from the cervix. The operation, which was technically not difficult, served to remove the large venous thrombotic focus and the original portal of entry (the placental site). The right internal iliac vein appeared normal. Nevertheless thrombi must have been overlooked, for, as can be assumed from the fever chart, the infection continued unchecked. The retrocervical slough and retroperitoneal abscess along the course of the excised vein, found at autopsy, do not appear to have contributed to the fatal issue. The former had free means of drainage toward the vagina, the latter was well walled off and apparently not progressive. The large parietal thrombus, which was found postmortem, extending into the vena cava almost to the renal vein, must be regarded as the fatal



factor. This view is substantiated by the numerous lung foci, which must be attributed to emboli torn away from the thrombus.

Removal of the uterus in this case seemed justified by the findings. Usually, however, I think that ligation and excision of palpably diseased veins, and ligation of *all* the cardinal veins of the uterus, even if apparently healthy, should be preferred, as this operation opens fewer new channels for infection than does hysterectomy, and in this low grade of infection, ligature probably offers an efficient barrier.

The operation as is abundantly proved by the cases reported in the literature, is well borne even by debilitated patients, and the danger of postoperative peritonitis is not great. The indications for intervention are, however, most difficult to determine, as we have as yet, no certain means of recognizing thrombophlebitis in its earliest stages. Therefore, operation is performed equally as often too soon as too late, depending upon the temperament of the surgeon. Another difficulty in forming a definite opinion of the operation, results from the impossibility of critically judging those cases which recover. If all unoperated cases of thrombophlebitis terminated fatally, our task would prove easier; fortunately this does not hold good. The percentage of recoveries has been variously given as from 7 to 70 per cent. Our laboratory aids, likewise, offer but little assistance. Blood culture is commonly negative. Perhaps the observations of Schottmueller that anærobic streptococci are found in thrombophlebitis may prove of value. If, in cases which recover after operation this organism is found in the blood, we may take for granted that the particular case, if it had not been operated, was at least grave, though not necessarily fatal. At present we have not even this uncertain standard to judge by.

A MODIFICATION OF THE USUAL TECHNIQUE IN THE DELIVERY OF THE FIRST ARM IN PODALIC VERSION OR BREECH PRESENTATION

By DON CARLOS GUFFEY, M. Sc., M. D., Kansas City, Missouri
Associate Professor Obstetrics and Gynecology, University of Kansas

THE usual method of delivery in podalic version or breech presentation whereby traction is made upon the body as soon as the umbilicus appears, although strong pressure is also made upon the uterus, frequently causes the arms to become extended alongside the head. The delivery of the first arm from this extended position is often difficult; and it is still more difficult if the arm is found around the back of the neck in the so-called nuchal hitch. A great deal of time may be lost in this part of the delivery and the alloted eight minutes after the birth of the umbilicus have often expired before any attempt can be made to deliver the after-coming head. The great haste which becomes necessary after so much delay may cause extensive laceration. The difficulty of arm delivery with frequent and forcible introduction of the fingers causes extensive bruising of the maternal tissues. Moreover, the arm is sometimes broken in the effort to bring it down in front of the face or to loosen it from a nuchal hitch.

The difficulty of delivery, the time lost with its consequent haste, the greater frequency of laceration as a result of this haste, the extensive tissue bruising from forcible manipulations, and the danger of fracture of the humerus or clavicle — all suggest the advisability of a modification of the technique in delivery of the first arm.

The proposed method consists simply in the delivery of the arm at the same time the body is delivered. When the feet (or the foot, if desired) have been delivered at the vulva, one hand of the operator holds them while the other is introduced into the uterine cavity and an arm seized, preferably the right, since the bringing of this arm into the left sacroiliac fossa will cause the head to engage in the more desirable right oblique with the occiput anterior. The hand of the child is then brought into the vagina and traction is made upon it at the same time as upon the feet or body. The hand of the operator is not removed from the vagina until the breech presents at the vulva or is actually born. As the body is grasped by the outspread hands the arm is included. The body with the first shoulder and arm is delivered with surprising ease, not more than one minute

being required for this portion of the delivery. The second arm and the head are delivered by the usual method.

The proposed method has now been used by me in ten cases: eight podalic versions and two breech presentations. In all cases of transverse presentation with a prolapsed arm the usual plan of throwing a tape around the prolapsed hand to prevent its return to the uterine cavity has been followed. It was this procedure which suggested the nature of the modification. In two cases both arms were brought down at the same time but the procedure was somewhat troublesome and of no special value, since it is the first arm and not the second, even though in a nuchal hitch, which causes the trouble. It is advised, therefore, to bring down only the one arm.

The disadvantages of this method are: (1) The added risk of infection from the introduction or re-introduction of the hand into the uterine cavity. It is to be remembered, however, that the hand passes into the amniotic sac and does not come in contact with the uterus except at the cervix and then not in such a way as to cause injury. The delivery of the first of the after-coming arms in the usual way frequently requires the repeated introduction of at least the fingers into the cervical canal, and at a time, too, when the likelihood of their being soiled is very great. Moreover, the actual force exerted upon the cervix by the operating fingers or the child's elbow is much greater than by the whole hand passed along the child's abdomen.

(2) A second and more serious objection which I have experienced is the inability to introduce the hand into the uterine cavity. The only instance of this kind occurred in the delivery of an eclamptic patient in whom the uterus became tetanically contracted after the version had been consummated. In this case the usual technique was followed. Ordinarily there is an abundance of space at the cervix and in the uterine cavity for the introduction of the hand.

(3) A third disadvantage comes from the size of the operator's hand. Very few hands, however, when folded into a cone will not pass easily into a vagina or cervix through which the ordinary head will pass. It is true that the hand retained within the vagina at the time the breech is delivered will stretch the vulva greatly, but in none of my cases has a laceration occurred or even seemed likely to occur from this cause. On the contrary, this would seem to be a definite advantage in that it would secure perineal relaxation for the after coming head.

The advantages of the method are: (1) Much valuable time is saved, since it usually takes as long to deliver the first arm from a nuchal hitch or extended position as it does the head. The child's life is, therefore, less endangered than by the usual method.

(2) Lacerations of importance are less likely to occur, since the usual haste and violence are unnecessary. Moreover, perineal relaxation may be secured by the hand and breech at the time of the birth of the latter.

(3) Fractures of the humerus or clavicle will be less likely to occur, since the uterus affords an abundance of room for manipulating the arm; a nuchal hitch can be easily corrected by the hand in the uterus, while it is corrected with difficulty in the usual method of delivery.

(4) If cervical dilatation is not complete it may be completed manually when the hand is passed in for the arm. This is of special importance in breech presentations, in which cervical dilatation is frequently unsatisfactory. For the cervix to contract around the neck of an after-coming head means almost certain fœtal death and extensive cervical laceration.

EDITORIALS

SURGERY, GYNECOLOGY AND OBSTETRICS

EDITORIAL AND BUSINESS OFFICES
103 STATE STREET . . CHICAGO, U. S. A.

PUBLISHERS FOR GREAT BRITAIN
BAILLIERE, TINDALL & COX
8 HENRIETTA ST., COVENT GARDEN, LONDON, W. C.
ENGLAND

SUBSCRIPTION, PER ANNUM, IN ADVANCE
United States and Canada $5.00
Foreign Countries . . . $6.00 (25 Shillings)

Managing Editor . FRANKLIN H. MARTIN, M.D.
Associate Editor . . ALLEN B. KANAVEL, M.D.

JANUARY, 1911

THE SECOND CLINICAL CONGRESS OF THE SURGEONS OF NORTH AMERICA

The universal interest displayed by surgeons in the recent Clinical Meeting held in Chicago, which resulted in the organization of the Clinical Congress of the Surgeons of North America, lends importance to the selection of the next meeting place of the Congress.

After a very careful consideration on the part of the Executive Committee of the Congress of the requisites for a second meeting which should equal or excel the first one in success, viz.: a city with unlimited clinical facilities and a large body of teaching surgeons who would enthusiastically undertake the task, Philadelphia was unanimously selected.

This choice was naturally influenced by the result of an interview in Philadelphia between a number of the leading surgeons of that city and the Secretary of the Congress, at which time it was declared that the surgeons of Philadelphia would welcome an opportunity to entertain the next meeting.

The Executive Committee of the Congress in deciding upon Philadelphia as the next meeting place announces that the probable date of the meeting will be November 7 to 16, 1911, inclusive, and has appointed the following Committee of Arrangements to coöperate with the officers of the Congress in preparing the details incident to the Congress:

JOHN G. CLARK, CHAIRMAN

CHARLES H. FRAZIER	JOHN B. DEAVER
JOHN H. GIBBON	JOHN B. ROBERTS
ROBERT G. LE CONTE	WILLIAM B. VAN LENNEP
WILLIAM L. RODMAN	J. MONTGOMERY BALDY
GEORGE E. DE SCHWEINITZ	EDWARD MARTIN
EDWARD P. DAVIS	E. E. MONTGOMERY
FRANKLIN H. MARTIN	BARTON COOKE HIRST

DEPARTMENT OF ORTHOPEDIC SURGERY

Beginning with the next number of this publication a department for the review of the literature of Orthopedic Surgery will be established. It is with pride that we announce that the following orthopedists have accepted the responsibility of conducting this important addition to our magazine.

DR. JOHN RIDLON, Chicago.
DR. E. W. RYERSON, Chicago.
DR. JOHN L. PORTER, Chicago.
DR. ARTHUR STEINDLER, Des Moines, Iowa.
DR. H. WINNETT ORR, Lincoln, Nebraska.

TRANSACTIONS OF SOCIETIES

CHICAGO SURGICAL SOCIETY

REGULAR MEETING HELD NOVEMBER 11, 1910, WITH THE PRESIDENT, DR. JACOB FRANK, IN THE CHAIR

DR. E. W. ANDREWS read a paper entitled "Pneumatic Bursting of the Intestine; a New Type of Industrial Accident." (See p. 30.)

DISCUSSION

DR. D. W. GRAHAM: We are certainly indebted to Dr. Andrews for the presentation of this subject and for collecting the literature pertaining to it, and in connection with the paper I wish to report a similar case.

A patient came into my hands a year ago last September with a history of having had a compressed air tube placed against his buttocks. The nozzle was placed against the seat of the trousers and the stopcock turned on, and it was reported to me that there was a pressure of 140 pounds to the square inch. The patient entered the hospital four or five hours after the accident. He was in collapse; he was cyanotic; his pulse was hardly perceptible; his breathing was forty to the minute or thereabouts; he had a temperature of 105°, according to the hospital record. With this history and the greatly distended abdomen there was no question as to the diagnosis, or what should be done. So the abdomen was opened between the symphysis and the umbilicus; air rushed out, as has been described by Dr. Andrews. The peritoneum was dusky, somewhat injected throughout, and there were flakes of fecal matter and blood clots everywhere on the surface of the peritoneum, as if shot from a shotgun. Another observation which I made, and to which Dr. Andrews did not refer, was that the intestines were completely collapsed. Every loop of intestine which could be felt or seen was collapsed. The rupture was in the anterior wall of the rectum. The opening of the serous and muscular coats was four inches in length, extending from the promontory of the sacrum down pretty nearly to the bladder. On examining this I found the opening in the mucosa was not more than one inch. I suppose the explanation of this difference is that the outer coats are less distensible than the mucosa. The operation consisted in sewing up the rupture in the usual way as quickly as possible. I sponged out the grosser part of the material that was in view, and made a large drain. The patient died in about twelve hours thereafter.

DR. FRANK PIERCE: As the case reported by Dr. Andrews has been so fully described by him, there is very little I can add of interest or of knowledge about it. There are one or two points, however, I would like to call your attention to. In the first place, when this case was seen by me his state of collapse was greater than that which has been mentioned. At the time the peritoneum was opened there was a very small, almost pinpoint, opening made in the peritoneum, the air was let out very slowly, but at the end, when the pressure was entirely relieved, the patient was in a state of complete collapse, so much so that he was pulseless, and with the stethoscope placed over the heart one could hardly elicit heart sounds. While on the table he was given salt solution, in addition to adrenalin chloride, and the other stimulants which were given. When sent back to bed he was placed in the Fowler position, and given continuous saline solution until Dr. Andrews saw him. I noted at the time the point which was mentioned by Dr. Graham, namely, the bowels were completely collapsed.

Another point in this case which has not been mentioned, and which showed from a diagnostic standpoint the location of the point of injury, was an area of ecchymosis or extravasation of blood into the tissues extending from the crest of the ilium to the level of the twelfth rib on the left side and a little behind, showing unquestionably that there was not only rupture of the bowel into the peritoneal cavity, but an extraperitoneal rupture or spreading of the peritoneal fold, so that the blood was extravasated into the tissues and into the skin.

Let me mention one more point in connection with this case. Dr. Andrews stated that in the Omaha case no autopsy was made. He overlooked the point in this history which I mention

now, that an autopsy was made in that case, and the rupture was at the splenic flexure. The amount of air pressure was not mentioned, but I presume it was less than in our case, so that the current of air passed the sigmoid, but was stopped at the splenic flexure.

Dr. Charles C. Godfrey, of Bridgeport, Conn.: I would like, in an imperfect manner, to call attention to a similar case that occurred at Bridgeport, Conn. At the Crane works, something over a year ago, some men who were fooling with a companion, used, I think, a compressed air tube with a pressure of 90 pounds to the square inch, which was pressed against the anus of the victim. The man died before medical attendance could reach him. The perpetrators of the act immediately left town and have not been heard of since. I think the coroner's medical examiner made an autopsy, and I will see that Dr. Andrews gets the facts of the case.

In regard to bursting the bowel by air pressure, while this case does not come under the head of those we are speaking about to-night, still I recall the case where a man was pushing a moving table in a factory, his foot resting on a block of wood. His foot slipped, he fell to the floor, and was taken home in great distress. When I saw him he was in a condition of partial collapse. I sent him to the hospital immediately, operated, and found the ileum was ruptured over a space of about one inch, about nine or ten inches from the ileocecal valve. The wound was repaired, and the man made an uninterrupted recovery. It did not occur from anything other than the pressure of air in the intestine. There was no adhesion or any other cause for the rupture.

Dr. William Hessert: In this connection I recall a case which I reported several years ago in the Journal of the American Medical Association. It was a case in which the mechanics were similar to the pneumatic bursting of the intestine, the case is one in which the injury was caused by hydrostatic pressure. The history is briefly this: An Italian laborer on arising in the morning, and desiring to take an enema, took a piece of garden hose, attached the same to a faucet in the kitchen, inserted one end in his anus, and turned on the water. He experienced severe pain after a moment or two, and desisted in his further operations, and went to work. After two or three hours he experienced severe abdominal pain and went home. He was taken to the Policlinic Hospital by his friends an hour or two after that. I saw him at two o'clock in the afternoon, about seven hours after the injury. He was then in collapse; anxious facies, and typical symptoms of beginning peritonitis; pulse 130; he had vomited; respiration was labored and short; the abdomen was slightly distended and board like; there seemed to be more tenderness in the lower region of the abdomen and slightly on the left side. Having obtained the above history, and finding the patient in this condition, I incised in the median line, and on opening the peritoneal cavity found it filled with a solution of feces, with large and small bits of fecal matter floating around. In the sigmoid flexure there was a laceration about an inch and a half long. In this laceration was a scybalous mass projecting, half delivered. The abdomen was washed out with saline solution in the usual way; the ruptured bowel was sutured; a large rubber tube was placed in the cul-de-sac, the wound closed, and the patient made an uneventful recovery.

Dr. L. L. McArthur: I have had no experience of this kind, but in instructing nurses regarding the giving of what they call high enemata, I see that the experiments of Dr. Andrews show that the hanging of the irrigating bag at the height at which some of them are hung approaches a perilous pressure — six feet of pressure. I have been taught that gives two and four-tenths pounds to the square inch, and if Dr. Andrews' experience is correct, it makes it a very high pressure for even the normal bowel to stand, he having had the bowel rupture at four pounds of pressure to the square inch. Of course, where the bowel is weakened by inflammatory processes or by ulcerations, and particularly where on the third, fourth, or fifth day after an appendectomy the suture material has had a chance to soften, if they use such a pressure as that, they could have leakage at that point, and twice in my experience leakage has occurred at this point, once fatally, and the other time I was fortunate enough after the use of turpentine and soapsuds, which escaped from the end of the appendix, to secure recovery after early opening of the abdomen.

Dr. John B. Murphy gave a talk, which was illustrated by numerous stereopticon slides, on "Surgery of the Joints."

ABSTRACTS OF CURRENT LITERATURE

DEPARTMENT OF SURGERY

UNDER THE CHARGE OF

FREDERIC A. BESLEY, M. D.

GEORGE E. BEILBY, M. D. — WM. R. CUBBINS, M. D. — AIMÉ PAUL HEINECK, M. D.
WM. C. DANFORTH, M. D. — FREDERICK G. DYAS, M. D. — G. T. COURTENAY, M. D.
FRED C. ZAPFFE, M. D. — JAMES F. CHURCHILL, M. D. — B. J. O'NEILL, M. D.
ARTHUR B. EUSTACE, M. D. — JOHN A. WOLFER, M. D. — H. A. POTTS, M. D.

The Clinical Aspect of Intussusception. J. E. ADAMS. *The Practitioner*, 1910, lxxxv, 697.

This report is based on 100 consecutive cases treated at St. Thomas Hospital, London, during a recent period of eight years. The following is a tabulation of the cases as to the length of duration of the condition before admission to the hospital and the ultimate results of the treatment.

Length of History	Cured	Died
Less than 24 hours	17	6
One day and less than 48 hours	21	11
Two days	11	6
Three days	2	11
Four days	4	3
Over four days	4	4

Seventy per cent of the cases were in children under one year of age, males predominated, and there was no relation to diarrhœal diseases. Polyp or tumor of the intestinal wall was an important factor, but injury was recorded in only one case.

The anatomical types were as follows: Entero-colic 73, colic 16, enteric 10, not noted 1.

Symptoms. Pain present in at least 92 per cent. Vomiting in 90 per cent. Blood per rectum in 92 per cent of cases, but unusual after 10 years of age. Constipation in 33 and diarrhœa in 13 cases.

Physical signs. Intussusception is a disease of well nourished infants (88 cases well nourished at time when first seen). Abdominal distension present in only 22 per cent. Must have abdominal tumor to make diagnosis. In 27 cases tumor felt per rectum.

Diagnosis. Can be distinguished from liver, spleen, and kidney because it cannot be lifted from behind. Mesenteric glands (tubercular) may cause some trouble. Henoch's purpura with effusion into intestinal wall may be impossible to differentiate until purpuric spots appear on the skin.

Treatment. Ninety-one operated upon, 59 cured, 32 died, mortality 35.1 per cent. The principal cause of death is shock. This, Adams thinks, is best combated by keeping child in air of temperature of 100° to 105° F. He accomplishes this by putting heavy blankets over the bed and bringing an electric light under this cover.

It may be of some aid to give an enema just before or during the operation, with the idea of partially reducing the intussusception and thus shortening the time of the operation. Every means should be taken to save time and avoid shock. Abdominal wall must be strongly sutured to avoid rupture. C. G. GRULEE.

Congenital Hypertrophic Stenosis of the Pylorus. J. H. NICOLL. *The Practitioner*, 1910, lxxxv, 659.

Reports nine cases seen in the last six months. Five of these were treated only by diet because they seemed to be mild. In relation to diet, Nicoll advises frequent changes and, if no improvement in three weeks, no matter how slight the case, operation. Very simple feeding measures, such as diluted milk to which baked flour paste was added, were used. The other four cases were operated upon, the operation in one case being pyloroplasty, in two cases posterior gastroenterostomy, and in one appendicectomy. In the last case the condition of the patient was so desperate that no operation on the stomach could be done and the appendicectomy failed to save the patient's life. The other three were successful. He lays great stress in these cases on early diagnosis, a competent operation, and careful attention to diet following the operation. Appendicectomy is advised as an auxiliary operation. C. G. GRULEE.

Intestinal Diverticula — A Pathological and Clinical Study. JOHN A. HARTWELL AND RUSSELL L. CECIL. *The American Journal of the Medical Sciences*, August, 1910.

The condition known as diverticulum of the intestine has been recognized as a pathological entity for more than a hundred years, but knowledge of its relation to perforative peritonitis is of recent date, and up to the present time few cases have been

operated upon in which a pre-operative diagnosis was made. Cases, however, in which this condition proved to be the underlying cause of peritoneal infection have multiplied of late, so that its complete analysis is a matter of interest both to the scientific investigator and to the practical physician and surgeon. Under the term diverticulum of the intestine the authors include any outgrowth of the intestinal wall, not neoplastic in character, which has had at some time a lumen connecting it with the intestine, and whose walls are composed of structures similar to those found in the intestines. Under this definition, Meckel's diverticulum is included as a congenital anomaly, and the appendix veriformis as a normal vertigial diverticulum. They are further classified as *true diverticulum*, when the outgrowth is composed of all the structures which are found in the normal intestinal wall, and *false diverticulum* when some of these structures are absent. From personal experience and a review of recent literature the authors conclude that the condition is far from rare and that it is the seat of great danger to health and life. From their studies it has been proven that intestinal diverticula may be found in any portion of the alimentary tract from the pylorus to the anal ring. The duodenum has furnished a large number; the whole small intestine has shown them; the appendix vermiformis has not escaped; and they have been found in large numbers in the colon and in the sigmoid. Apparently the sigmoid is the favorite site for their development. The authors discuss in detail the various theories that have been advanced to explain the etiology of this interesting condition, but they are able to arrive at no definite conclusions except that from some cause a weakness exists in the intestinal coats, and by reason of this weakness, a pouching of the coats takes place when any undue pressure arises. Conditions such as age, constipation, excessive fat or emaciation, portal congestion, and the anatomical weakness at the point of entrance or exit of vessels they believe all play an undoubted rôle.

The pathology of intestinal diverticulum is considered under two distinct conditions; its pathology when uncomplicated by secondary changes, and the pathology when such changes have intervened. It is apparent that the diverticulum itself is absolutely a harmless condition as far as the health of the individual is concerned, it is only when secondary changes occur that symptoms are produced. The authors' classification of the secondary changes which give rise to symptoms is one which is in every way comparable to those occurring in the case of the appendix.

1. There may arise acute inflammation of the diverticulum without perforation, which results in a peritonitis or a cellulitis around it.

2. The inflammatory process may cause destruction of the coats of the diverticulum when a perforation results, leading either to a localized abscess, a general peritonitis, a general blood infection, or all three.

3. The diverticula may become the seat of a mild, subacute, or chronic inflammation, which does not produce marked changes. This condition is subject to temporary exacerbations and remissions.

4. A chronic inflammation may occur in the diverticulum which leads to thickening of the walls of the diverticulum itself and from the irritating effect of the toxins in the lymphatics and venules, the process spreads to the surrounding tissues, resulting in thickening of the whole intestinal wall and of its mesentery.

When multiple diverticula are present, a long piece of the gut may be involved. Here, again, adhesions may lead to intestinal obstruction, or this obstruction may result from narrowing of the lumen. Here, also, a chronic perforation may take place.

5. Carcinoma may develop on the diverticulum.

The authors report four clinical cases and the pathological findings in fourteen postmortem specimens.

The authors from this study draw these conclusions:

1. Diverticulum of the intestine is a common condition.

2. The large bowel is the most frequent site, particularly the descending colon and the sigmoid.

3. Children and young adults are subject to diverticula, and to the secondary changes occurring in them.

4. All diverticula are probably true in their incipiency. The false characteristics are the results of their growth.

5. An inherent weakness existing in the muscularis is probably an important factor in the etiology of diverticula. In the small intestine this weakness appears to exist along the mesenteric attachment.

6. Diverticula undergo the same pathological changes as the appendix vermiformis, and give rise to much the same general symptoms. These pathological changes are not uncommon.

GEORGE E. BEILBY.

ABSTRACTS OF CURRENT LITERATURE

DEPARTMENT OF GYNECOLOGY

UNDER THE CHARGE OF

J. CLARENCE WEBSTER, M. D.
J. C. HOLLISTER, M. D.
HELIODOR SCHILLER, M. D.
E. C. DUDLEY, M. D.
GEO. DE TARNOWSKY, M. D.
CAREY CULBERTSON, M. D.

After Results of Abdominal Operations on the Pelvic Organs. ARTHUR E. GILES. *Journal of Obstetrics and Gynecology of the British Empire*, March, 1910.

In this study based on a series of one thousand consecutive cases, Giles undertakes an elaborate tabulation of his operative work on the female pelvis. This study, really a monograph, is divided into five parts and is presented in as many numbers of the Journal of Obstetrics and Gynecology of the British Empire during the past year, four of these parts including tables wherein each case is presented in some detail. The classification, from which conclusions are worked out, is as follows:

	Divisions		Groups	
	Cases	Deaths	Cases	Deaths
1. Unilateral Salpingo-oöphorectomy.				
A. For tumors	122	4		
B. For inflammatory disease	44	3		
C. For extrauterine pregnancy	52	3	218	10
2. Bilateral Salpingo-oöphorectomy.				
D. For tumors	42	5		
E. For inflammatory disease	100	4		
F. For extrauterine pregnancy	18	0		
G. For uterine fibroids	2	0	162	9
3. Abdominal Hysterectomy.				
H. For fibroids	76	6		
I. For uterine fibrosis	9	0		
J. For carcinoma	8	1	93	7
4. Hysterectomy and Unilateral Salpingo-oöphorectomy.				
K. For fibroids	64	2		
L. For fibrosis	9	0	73	2
5. Hysterectomy and Bilateral Salpingo-oöphorectomy.				
M. For ovarian tumors	16	0		
N. For uterine fibroids and fibrosis	68	2		
O. For inflammatory disease	23	4		
P. For carcinoma of the uterus	14	1	121	7
6. Conservative Operations for Fibroids.				
Q. Abdominal myomectomy	20	1		
R. Myomectomy and unilateral salpingo-oöphorectomy	6	0	26	1
7. Operations for Displacements.				
S. Hysteropexy and myomectomy	26	1		
T. Hysteropexy	220	4		
U. Hysteropexy and unilateral salpingo-oöphorectomy	62	0	308	5
	1,001	41	1,001	41

The after results of operations for the removal of the appendages on one side are considered from the standpoint of five phases and are best presented in the author's own summary:

1. Speaking generally, operations for the removal, of the appendages of one side have no detrimental effect on the general health, the cases where ill-health could be traced to the operation numbering not more than five per cent. About 90 per cent of cases were actually better after the operation than they were before.

2. The relief of symptoms is well marked after these operations; about 87 per cent of patients were free from pain afterwards or experienced less pain than before the operation, whilst a further five per cent were free from pain for a time and developed pain later from other causes. Dyspareunia, dysmenorrhœa, menorrhagia, and leucorrhœa were relieved in a number of cases.

3. The removal of the appendages of one side was followed by irregularity, diminution, or cessation of menstruation in a small number of cases (8); and in six cases there followed a diminution of the sex instinct.

4. The chances of the disease developing in the remaining ovary and tube are not very great; such a recurrence took place in about ten per cent of cases. Consequently, in view of the definite value of the remaining ovary and tube it is always worth while preserving them when they appear to be healthy. Soiling of the peritoneal cavity with the contents of an ovarian cyst favors the occurrence of later disease and therefore the interests of the patients are safeguarded by the removal of these cysts (however large) intact without tapping.

5. The remaining tube and ovary have a considerable value from the point of view of subsequent pregnancy; 33 patients, or 25 per cent of the married women under 40 became pregnant. Of these, 19 had fulltime deliveries (some repeated), 5 had miscarriages, and 7 had extrauterine pregnancy, whilst two were pregnant when seen. It would appear that after the removal of the appendages of one side there is a greater liability to the occurrence of extrauterine pregnancy than is the case with normal women. The 19 women who had full-time pregnancies bore, between them, 25 children;

and four more children were born at fulltime when ovariotomy was undertaken during pregnancy.

A study of the sex of these children in relation to the side on which the remaining or active ovary was situated definitely refutes the theory that the right ovaries produce boys and left ovaries produce girls; it shows clearly that there is no relation between the side from which the ovum is derived and the sex of the child.

The after results of the removal of both appendages is studied with cases from both sections 2 and 5 as a basis. Incidentally in considering the deaths in these divisions, the author calls attention to the following statistics:

Double salpingo-oöphorectomy	Cases	Deaths	Mortality
For ovarian tumor	42	5	11.9%
For inflammatory disease	98	4	4.1%
Total extirpation			
For ovarian tumors	21	0	0 %
For inflammatory disease	36	5	13.8%

Hence it seems a warrantable inference that the removal of the uterus increases the risk in inflammatory cases, but not in cases where the operation is done for tumors.

The summary of conclusions is likewise interesting:

1. The removal of both ovaries and tubes has no marked detrimental effect on the subsequent health, for 78 per cent of the patients were in very good health afterwards, and a further 13 per cent, though suffering in different ways, were better than before the operation, making in all 91 per cent who were quite well or were improved. The condition of the general health is even better than it is after unilateral salpingo-oöphorectomy.

2. The likelihood of later trouble developing in connection with the uterus when the organ is left is relatively small, as such an occurrence took place in only 7 cases out of 105. It is therefore worth while leaving the uterus in all cases where it appears to be healthy. The removal of the uterus appears to increase the immediate risk of the operation in inflammatory cases.

3. Menstruation continues after these operations in about 40 per cent of the cases, the proportion being largest in cases where the operation was done for inflammatory disease. When menstruation persisted after ovariotomy for tumors it was mostly in cases where the tumors were parovarian or intraligamentary. The inference is that some portion of ovarian tissue has remained behind in these cases.

4. The characteristics of the artificial menopause produced by the complete removal of both ovaries are as follows:

a. Flushes of heat come on within three months of the operation in 80 per cent of the cases, an within a month in 55 per cent.

b. These flushes commonly last for several years, and may go on as long as 10 years. Probably the average duration would be three or four yeais.

c. The majority of patients retain their bodily vigor and energy, namely, about 72 per cent; 28 per cent are easily tired or complain of lack of energy. This may be partly due to the fact of an abdominal operation, as distinct from the influence of the menopause.

d. The influence of the artificial menopause in causing mental depression is relatively small, amounting to about ten per cent of the cases.

e. In a large proportion of cases the sex instincts are not affected; in 68 per cent they were either unaffected or increased; in 16 per cent they were diminished; and in a further 16 per cent they were lost after the operation.

f. The artificial, like the natural menopause, is followed by some atrophy of the uterus and the vagina, but not in all cases; 62 per cent showed some change within two years; 73 per cent within five years; and 82 per cent when more than five years had elapsed. Many patients showed a tendency to obesity, but this effect is not so marked as after the natural menopause. There is no foundation for the view that the removal of the ovaries leads to the development of masculine characteristics, such as growth of hair on the face, atrophy of the breasts, and a deepening of the voice, except perhaps in cases where the operation is done before or about the age of puberty.

The after results of hysterectomy for uterine fibroids and fibrosis are deduced from a study of the cases represented in sections 3 (H and I only), 4 and 5 (N only). Five points are included here in the author's summary:

1. The effect on the general health of hysterectomy for fibroids is very satisfactory, in as much as 70 per cent of the patients were in very good health after the operation, and as many as 96 per cent were better than before the operation.

2. The fate of the cervical stump after supravaginal hysterectomy need cause no apprehension; in 181 cases there was not one that showed any sign of malignancy; and in 98.3 per cent there was no trouble of any kind. In cases of fibrosis, however, it is important to do a panhysterectomy, or at least to make sure that the whole of the body of the uteru is removed; as a small portion of the body of the uterus may keep up hæmorrhage.

3. After supravaginal hysterectomy, menstruation, or at least a monthly discharge of blood, may take place if only a small portion of the body of the uterus has been left behind.

4. The cessation of menstruation after hysterectomy with preservation of one or both ovaries is an "apparent" menopause; the constitutional changes incidental to the true menopause, as indicated by heat flushes, are delayed from one to several years in these cases. Nevertheless the removal of the uterus brings about the true menopause a good deal earlier than the usual time.

5. After hysterectomy with preservation of the

ovaries there is some diminution of the sex instincts in about 20 per cent of the cases; but the sex instincts are practically never lost altogether.

A study of the after results of hysterectomy for cancer develops conclusions similar to those brought out by other operators. Both conservative and radical operations were performed. In some cases the operations have been of too recent date to be of permanent value statistically.

1. The results of hysterectomy for carcinoma of the body of the uterus are very good; as all six cases traced show no signs of recurrence after periods varying from eight months to three years. The results of hysterectomy for carcinoma of the cervix are satisfactory, as far as the recent character of most of the cases allows deductions, since 8 out of 10 cases showed no recurrence after periods varying from six months to two and a half years.

2. The effects on the general health are very good, as all the patients were better after the operation, and 9 out of 14 were in very good health.

Cases from sections six and seven (S only) are the basis for the study relative to after results of abdominal myomectomy. Fifty-one such cases were operated upon, two of the patients died (primary mortality) and 40 were traced.

Relative to the value and scope of myomectomy versus hysterectomy for fibroids, Giles has this to say:

It may be laid down as a general rule that hysterectomy is preferable to myomectomy (a) in the case of multiple fibroids; (b) with cervix fibroids; (c) in the case of single large interstitial or intrauterine fibroids in women over 40; (d) when interstitial or subperitoneal fibroids are associated with hæmorrhage, making it probable the intrauterine fibroids are also present.

Myomectomy is permissible from the operative point of view in cases of (a) pedunculated subperitoneal fibroids; (b) small interstitial fibroids when they are not more than three or four in number; (c) solitary intrauterine fibroids or fair sized solitary interstitial fibroids in women under 40, and more particularly in young married women.

The conclusions of this section of the subject are:

1. The general health after myomectomy is very good, 85 per cent of patients being in quite good health, or at least better than before the operation.

2. The likelihood of recurrence of fibroids is relatively small, the cases of recurrence amounting to under 10 per cent; 90 per cent were free from recurrence after periods varying from one to seven years.

3. The menstrual loss is moderate or even scanty in about 85 per cent of cases, many of the patients stating that the loss was less than before the operation.

4. The uterus from which fibroids have been removed may be serviceable for childbearing, three patients out of 15 married women under 45 having become pregnant subsequent to the operation; the uterus bears the strain of pregnancy and labor without difficulty.

The after results of operations for uterine displacements are considered in connection with two hundred forty-eight cases represented by section 7 and traced. In all fairness the author explains these operations were combined in many instances with plastic repair to the cervix and to the vaginal walls, as well as with numerous currettements. The conclusions are summed up as follows:

1. The effect of hysteropexy on the general health is very good, as 90 per cent of the patients were better than before the operation, as many as 75 per cent being in quite good health; whilst among the 10 per cent who were not better the cause had nothing to do with the operation in one-half of them.

2. Symptoms are markedly relieved; 90 per cent of the patients had either no pain afterwards or had less pain than before the operation; 14 patients were relieved of dysmenorrhœa, 21 of dyspareunia, and 16 of headaches; 22 patients got relief from menorrhagia, and 13 from excessive leucorrhœa; 13 patients found their constipation improved.

As regards the effect of hysteropexy on the bladder, 18 per cent of patients experienced frequency of micturition, and 77 per cent had no trouble, or no more than before the operation.

4. The position of the uterus remains permanently good in about 95 per cent of the cases; about 5 per cent suffer from partial or complete return of displacements. The results in cases of procidentia are not quite as good as in cases of retroversion or prolapse; but 88 per cent of cases of procidentia show permanent good results. To obtain the best results in the latter cases combined operations are usually necessary.

5. In the event of pregnancy following hysteropexy, there is a slightly increased tendency to miscarriage if pregnancy follows too soon after the operation; hysteropexy causes no subsequent complications of labor, as out of 44 cases of fullterm delivery 40 had normal confinements, and the remaining 4 had complications independent of the operation.

6. When pregnancy follows hysteropexy the position of the uterus is not disturbed thereby, as the results after pregnancy were just as good as in cases where no pregnancy followed, and the cases of fulltime delivery showed only one case of partial return of displacement out of 29 cases. Among these therefore the uterus kept in good position in 96.6 per cent of the cases, as against 94.7 per cent in the case of patients who did not become pregnant.

In the final division of his research Giles considers the after results of abdominal operations in general, touching upon one or two points not previously brought out. The final conclusions are therefore interesting in themselves:

1. With regard to the general health after abdominal operations, it was found that 90 per cent of the patients were better than they were before the operation, 72 per cent being in quite good health. About 6 per cent were either worse

or at least no better, in many cases from causes quite independent of the operation; and a further 4 per cent had been much better for a time, and had suffered lately from ill-health due to local or general causes.

2. The period of invalidism after abdominal operations is limited to about three months in 60 per cent of the cases; of the remaining forty per cent about 25 per cent (10 per cent of the whole) cease to be invalids by the end of the first year; while 75 per cent (30 per cent of the whole) remain either invalids or semi-invalids. The age of the patient has a marked influence; the younger the patient, other things being equal, the quicker the convalescence. The severity of the operation has no apparent relation to the rapidity of the convalescence.

3. The memory appears to be affected in about 25 per cent of cases after abdominal operations; further, the deterioration of memory appears to be directly proportioned to the duration of the operation, as in cases of long operations for uterine carcinoma, the memory was affected in 50 per cent of the cases; in short operations for hysteropexy the proportion dropped to 18 per cent, and operations of intermediate duration showed proportionate percentages.

4. Sixty-four cases out of 770, or 8.3 per cent, required further abdominal operations. About 3 per cent were necessitated by direct sequelæ of the operation, and of these the cases of inflammatory diseases of the appendages supplied the largest proportion; six cases were necessitated by recurrence of uterine displacements; and 34, or 4.4 per cent, were required for conditions independent of the first operation. The risk of subsequent independent conditions requiring operation is greatest after unilateral salpingo-oöphorectomies, where it amounted to 9.5 per cent.

5. The chances of pregnancy following unilateral salpingo-oöphorectomy and conservative operations on the uterus are good; as 33 per cent of married women under 40 among these cases became pregnant afterwards; 73 per cent of the completed pregnancies went to the full term; there were 8 cases of extrauterine pregnancy, and 7 patients were pregnant when they were last seen. Of 60 labors, 55 were normal, and 5 had complications that had no reference to the operation; the chances of labor being normal after these operations are, therefore, just as good as is the case with patients who have had no such operations.

6. Eighty-eight per cent of the patients had no trouble at all afterwards with the scar; 7.7 per cent had stitch abscesses, and 3.6 per cent developed a hernia of the scar. The tendency to both complications is markedly greater after operations for inflammatory disease of the appendages; 90 to 93 per cent of the "clean" cases had no subsequent trouble. The tendency to stitch abscess is diminished by modern improved methods, and particularly by the use of sterilized rubber gloves during operations. CAREY CULBERTSON.

The Importance of Lecithin for the Differentiation of Different Species Among the Hemolytic Streptococci (Über die Bedeutung der Lecithins für die Unterscheidung verschiedenes Arten unter den Hæmolytischer Streptococcen). E. SACHS. *Monats. f. Geb. und Gyn.*, b. xxxi, h. 6.

This paper is an answer to an article by Fromme in which the latter comes to the conclusion:

1. That were are able by a culture medium composed of lecithin and bouillon to differentiate between (a) the pathogenic hæmolytic and (b) the saprophytic hæmolytic streptococcus, as the lecithin inhibits the growth of the pathogenic form much more than that of the saprophytic.

2. That through this differentiation the prognosis in these infections can be made more certain.

3. That our therapeutic actions should differ according to the outcome of this differential method.

For his experiments Sachs used highly pathogenic hæmolytic streptococci; for instance, one strain from a puerperal sepsis, a second from the pus of a suppurative meningitis (both patients died of sepsis), a third strain from a phlegmon, etc. But in spite of the fact that in his experiments he followed strictly the demands made by Fromme, in spite of the highest virulence of the strains used, not one strain would correspond to the claims of Fromme concerning the differentiation of the hæmolytic streptococci.

Out of many and very exact experiments Sachs concludes:

1. Lecithin has no efficient inhibitory quality upon the pathogenic hæmolytic streptococcus. Its apparent inhibitory faculty upon the growth of the cultures depends on the degree of its acidity and is not at all specific.

2. A differentiation of the hæmolytic streptococci by lecithin is impossible.

3. Therefore no conclusions are allowed concerning the prognosis. Fromme stated that the prognosis is better in the presence of saprophytic hæmolytic streptococcci.

4. Fromme advised, in febrile cases with retention of pieces of placenta, manual removal, after the bacteriological examination showed saprophytic streptococci. In contrast to this Sachs advises against any intrauterine procedure in the presence of any form of hæmolytic streptococci.

HELIODOR SCHILLER.

Temporary Sterilization of the Woman (Temporare Sterilisierung der Frau). DR. C. J. CUCURA *Wien. klin. Wchenschr.*, 1910, xxiii, 1635.

For temporary sterilization of the woman, Cucura makes an opening in the peritoneum of the broad ligament, places the ovary beneath the peritoneum, and sutures the opening. In his experimental work he has found no tendency to atrophy of the ovary following this procedure. He feels that this method of sterilization is advisable in many cases.

C. G. GRULEE.

BOOK REVIEWS

FRACTURES AND THEIR TREATMENT. By J. Hogarth Pringle, M. B. (Edin.), F. R. C. S. (Eng.) London and New York: Oxford University Press, 1910.

The discovery of the Röntgen rays has been followed by a revision of the older text-books on fractures, and has furnished the inspiration for new additions to the already voluminous literature on this subject. This new work, "Fractures and Their Treatment," is replete with valuable material, and is interesting as it reflects the English mode of treatment. The opening chapters are excellent. They relate to the mechanism and classification of fractures, to the diagnosis, to the process of union and injury to the soft parts and treatment of fractures in general, both simple and compound. The author, after the manner of his countrymen, in the treatment of broken bones enlists the aid of a most varied sort of mechanical and extension appliances. Bardenheuer's extension method is described and extensively copied, and judging from the text and illustrations, the plaster of paris dressing is rarely used. Lucas-Championiere's method of massage and mobilization is described. The open method of treatment by plates, wire, nails, or screws is favored in cases where the appliance will not hold a fracture reduced.

In that portion of the book devoted to the treatment of special fractures, the reader will notice the general use of apparently cumbersome apparatus applied to arms and legs, and cannot help deploring the confinement in bed which such a method entails. There is an absence of the simpler modes of treatment which can be copied by the doctor in general practice. The general use of the complicated Bardenheuer extension apparatus, demanding as it does constant vigilance to maintain it properly, will not become popular with the average American surgeon. When we have accomplished real anatomic reduction in the average fracture, the simplest dressing which will hold the bones in place is the best. No amount of traction by weights and pulleys can take the place of primary reduction. If the fragments will not stay reduced, then operate.

We agree with Pringle when he insists on the frequent removal of dressings for the purpose of massaging the muscles and mobilizing the joints, and the application of dressings, whenever possible, in such a manner as to render such manipulations possible.

There is a chapter on fractures and their results in connection with workingmen's compensation, and a table of various injuries and fractures showing an estimation of the depreciation in working efficiency of the injured workman.

In conclusion, we have a book which is well written and illustrated, and should prove interesting reading for the surgeon, yet, for reasons already assigned, it is not one which can be recommended to the general practitioner as a guide in his fracture work.

WILLIAM HESSERT.

PAPYRUS EBERS. THE FIRST MEDICAL BOOK. Translated from the original with comparative, illustrative, and commentary notes. By Carl H. von Klein, A. M., M. D. Subscription edition. Published by the author, 1911.

This book will consist of about 650 pages in two colors (red and black) the same as in the original, with six plates.

Those wishing to avail themselves of the opportunity to possess a copy of this interesting work of 19 years' labor should at once place themselves on the list of subscribers prior to the publication. The edition will be limited to the number of subscriptions. Price, $5.00. Address Dr. von Klein, John Crerar Library, Chicago.

HOOKWORM DISEASE; ETIOLOGY, PATHOLOGY, DIAGNOSIS, PROGNOSIS, PROPHYLAXIS, AND TREATMENT. By George Dock, A. M., M. D., and Charles C. Bass, M. D. St. Louis: C. V. Mosby Company, 1910.

This book is so written that it is of value not alone to the general practitioner, but also to one more advanced in the study of animal parasites. It is, on the whole, so well balanced that it would be very difficult to find anything worthy of severe criticism. Proper space is allotted to the historical consideration and to the geographical distribution. The zoölogic features are well depicted, and this part, in particular, is accompanied by well-chosen illustrations. The frontispiece, in colors, shows the parasite *in situ*, which is not only unique, but very instructive in considering the pathology of the disease. In the chapter on symptomatology, proper emphasis is given to the subject of "ground itch." In the part devoted to diagnosis, one of the most valuable features is the discussion of the proper methods to employ in looking for the ova, which should be of value in the consideration of the animal parasites in general. Under the subject of treatment, a good résumé is to be found. The value of the work is enhanced by the quality of the illustrations, excellent half-tones being made possible by the style of paper used.

A. A. GOLDSMITH.